# The Builder.

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## ILLUSTRATIONS.


The Ancient Cathedrals of Scotland: VI., Dunblane: from the South-West.—Drawn by Mr. Alexander McGibbon ..... *Double-Page Photo-Litho.*
Plan of Dunblane Cathedral.—Drawn by Dr. Rowand Anderson ..... *Double-Page Photo-Litho.*
View of Nave, Dunblane Cathedral, before Restoration.—Drawn by Mr. R. Phené Spiers, F.R.I.B.A. ..... *Double-Page Ink-Photo.*
New Windows for the Cathedral of Orléans, illustrating the History of Joan of Arc.—Designed by M. Jacques Galland, in collaboration with M. Gibelin ..... *Double-Page Ink-Photo.*


### *Blocks in Text.*


Sketches of Fountains ..... pages 498, 409 | Sketches of Dunblane Cathedral ..... pages 413, 414, 415, 416, 417
Diagrams illustrating article on "Geology" (Students' Column) ..... page 419


## CONTENTS.


Barry Dock and Town ..... 403
An Artist's Plea for Gothic ..... 404
Notes ..... 404
Letter from Paris ..... 407
On Various Types of Fountains ..... 407
The Architectural Association: Hard Wood Joinery ..... 410
Architectural Societies ..... 412
Engineering Societies ..... 412
Dunblane Cathedral ..... 413
View in Nave of Dunblane Cathedral ..... 417
Windows for Orleans Cathedral ..... 417
The London County Council ..... 417
Builders' Benevolent Institution: Annual Dinner ..... 417
Tullie House, Carlisle ..... 418
Norwich Cathedral ..... 418
The London County Council and Waterloo Bridge ..... 418
Student's Column: Geology.—XXIII. ..... 418
Obituary ..... 419
General Building News ..... 419
Stained Glass and Decoration ..... 420
Foreign and Colonial ..... 420
Miscellaneous ..... 421
Legal ..... 421
Meetings ..... 421
Recent Patents ..... 421
Some Recent Sales of Property ..... 422
Prices Current of Materials ..... 422


### *Barry Dock and Town.*

THE is customary to cite the cities of America as instances of rapid development, as if examples were unknown in this country. This to some extent arises from the tendency of the average Briton to rush away from his own country to see what may be remarkable outside his own island, neglecting almost wholly what is noteworthy within it. The creation of Barry is in its own way quite as remarkable as anything which the United States can show us, for a large and growing town has been created in a few years, bordering on what is undoubtedly one of the finest and most complete set of docks in the world—and, so far as regards the particular use to which it is chiefly put, the first in the world. As regards equipment and convenience, Cardiff, large, populous, and splendidly supplied with docks, has been growing gradually; from a mere fishing hamlet it has developed into a great coaling port. But the difference between the growth of one place and the creation of the other will be more obvious when it is pointed out that the West Bute Dock, the earliest of the Cardiff Docks, was not opened until 1839, yet before that date vessels congregated at Cardiff, and the Dock was opened, not to bring traffic, but to meet that which existed, as well as to enlarge it in the future. In 1855 the East Bute Dock was opened; this is the largest of the three Cardiff Docks, covering an area of 46½ acres; and this was followed by the Roath Dock in 1887. But when certain merchants, shipowners, and colliery proprietors decided to make a dock at Barry, they merely chose a place which was likely to be convenient for the collieries, and more accessible than Cardiff, since it lay seven miles lower down the Bristol Channel. But it was a bare expanse of marsh and mud—dock and habitations had to be created at a blow. The work was begun in 1884, and in June, 1889, Barry Dock, covering an area of 73 acres, was opened. Traffic had not to be fostered or sought for; it came, if we may so say, in a heap, for in the half-year ending December, 1889, the dock was used by 598 vessels, with a tonnage of 567,000 odd tons. In the corresponding period of 1890 the number of vessels had risen to 841, and the tonnage to 828,000 odd, whilst for the half-year ending December 31, 1892, the number of vessels was 1,034, of which the tonnage was 1,074,996. It is not yet five years since the dock was opened, but round it is now dwelling a population of between thirteen and fourteen thousand persons; churches, schools, banks, and hotels—all the buildings required for the moral, religious, and material welfare of a community have sprung into existence. There is railway communication with all parts of England, so that one may say almost instantaneously a commercial undertaking and a commercial community were created. It is customary to look in Wales for the picturesque, but this creation of modern enterprise is, in many respects, more remarkable than even the phenomena or the beauties of nature. From the architect's point of view it must be admitted that there is little to be said as regards either the new town of Barry or the new part of Cardiff. A number of brick houses, all of the same character, and very largely of the same size, have been erected; there is no attempt to charm the eye—so long as they can hold a certain number of inhabitants and keep out wind and wet, the object has been attained. The contrast between the solidity of Barry Dock and the perfection of its mechanical appliances, and the monotony, the mediocrity, and the superficiality of the surrounding houses, is very marked; and it cannot but be a matter of regret that, in such places as Barry and Cardiff, some attempt is not made to erect buildings pleasing to the eye, with open spaces and trees and gardens. It is the disgrace of English seaports that, round the finest engineering works, are often seen the worst of buildings of a domestic or social character, even though in places such as Barry there is opportunity for a new departure.

There are, however, two other points, in regard to which the success of Barry Dock is important. In one sense, it is a co-operative undertaking. That is to say, most of the large shareholders and those who were instrumental in its creation were persons who would in one way or another use it. Some were shipowners, others colliery owners, and thus it was unlike many undertakings the property of persons having no sort of interest in common with those who use them. Nor, again, was it promoted by persons desirous of getting the public to take up the shares. Probably this has been one secret of its financial success. It was not like many undertakings which are sound in principle but are over capitalised. Its shares now stand at 100 per cent. premium, so that those who were prudent enough to take part in the undertaking from the beginning have doubled their capital. Again, too, it is an example of the success of undertakings which are intended not by their creation to bring together a business, but to tap, so to say, one already full of life. The great area of the South Wales coalfields was ripe for a new channel of communication with the world, and so from the very moment of the opening of the Barry Dock vessels sailed from it to every quarter of the globe. So great has been the success of the existing dock that it is in contemplation at no distant date to almost double the present accommodation, whilst in about a year's time a new deep-water lock will be completed, which, together with some further dredging of the channel, will enable vessels to enter at all times of the tide.

We have dealt in the foregoing remarks with the general aspects of this great undertaking, and we do not propose to enter into descriptive details. It may, however, be desirable to point to one or two particulars which serve to illustrate the completeness of the work. First and foremost are the eleven high-level tips or staithes. These are high above the level of the dock and in connexion with the railway, and their advantage is that a truck has simply to be run along them, arrived at the end it descends on the platform to the shoot, is tipped, re-ascends, and runs back along a different line. As it passes along what may be termed the up line, it crosses a weigh-bridge, which records its full weight; as it passes back it crosses another

weigh-bridge, which records the weight of the truck alone. The exact quantity of coal deposited by each truck in the vessel is thus accurately registered, and the actual quantity shipped is thus known, and all disputes as to the amount of the cargo are prevented. As many of our readers may be aware, the weight of a waggon varies according to the state of the weather, and thus the weight printed on it cannot be regarded as accurate. When, therefore, a full waggon only is weighed, and the weight of the waggon itself as printed on it deducted, an accurate measurement of the ship's cargo is not always obtained. We have said that there are eleven of these high-level tips; each tip can discharge sixty waggons in an hour; indeed, sixty-eight waggons have sometimes been discharged. In other words, a vessel can be loaded at the rate of 600 tons per hour, so that if the eleven tips were all working at once, more than 6,000 tons can be put on board in an hour from the part of the dock where these particular tips are placed. But, in addition, there are eight low-level staithes. We may speak of some of the other excellences of this dock in a few words. It is lighted in every part with electricity, so that, as one result, the work of loading vessels can, in ordinary weather, be carried on with as little difficulty by night as by day. The gates are opened and closed, the capstans and all the machinery are worked, by hydraulic pressure, and the graving docks are emptied with rapidity by powerful pumps.

The day must eventually come when the coalfields of South Wales will be exhausted, and when it does the site of Barry Dock and Town will, doubtless, revert to its former desolation. But that time belongs to the dim and distant future, and for some generations the work which we have described will, doubtless, grow, existing as a striking example of the commercial energy and of the constructive capacity which is a characteristic of the English race.

## AN ARTIST'S PLEA FOR GOTHIC.

MR. WILLIAM MORRIS exhibits, in his critical attitude in regard to modern architecture and its possibilities, a remarkable example of sturdy independence and persistence of opinion, in contrast with the fluctuations of taste and feeling which have characterised English architects in the present century. Among the latter the worship of Gothic, as the starting-point for a new birth of architecture, seems to be nearly dead, and even with those who continue to work more or less in the spirit of Gothic architecture there is to be seen an increasing tendency to soften away the characteristic qualities of Gothic, and to mingle with it details derived from Classic architecture; while not a few of those who commenced as Gothic architects have practically dropped their allegiance and become confessed adherents of "Free Classic."

Mr. Morris will have none of this, and one of the uses to which he has turned his recent experiments in the art of printing has been to reissue from the "Kelmscott Press," as an example of the artistic make-up and printing of a book, a lecture on Gothic architecture delivered at the Arts and Crafts Exhibition in 1889; a little square grey volume printed in thick old-fashioned type, with ornamental initial letters to each paragraph, conventionalised leaves instead of "full stops," and those unequal margins, graduated in width from the narrow inner margin to the proportionately increasing margins at the top, outer edge, and foot of the page; an arrangement which we quite agree with him in liking. As to the general aspect of the print, for reading, we confess that we find it rather disturbing than soothing to the eye, and we fear that those whose business or pleasure it is to read many books would hardly be thankful if they were all printed in this fashion.

It is not unsuitable, however, to the book in question, which does not consist of lengthily reasoned paragraphs, but enshrines a number of unorthodox and (to the reader of the present moment) startling judgments in regard to architecture, past and future, in which very large questions are disposed of in very few words. There is nothing in it, indeed, which we have not heard before, and a good deal of it is what many people thought was done with. To find it all brought down upon us again afresh, in the most uncompromising manner, is the curious and unexpected element.

It is the old story again: that Greek architecture had no element of development; that the Renaissance was an overturning of the whole principle of architecture, an imitation of an imitation; that in Gothic alone the true spirit of architecture is to be found, and the possibility of further development. There are special points, however, in Mr. Morris's way of putting it. After dividing the whole of architecture into two groups, Classic and Mediæval, he subdivides the former into two, Barbarian (in the Greek sense) and Classical. The object of this subdivision is to urge that the Greek style, "the bones of it, its merely architectural part, is little changed from the Barbarian or primæval building, which is a mere piling or jointing together of materials, giving one no sense of growth in the building itself and no sense of the possibility of growth in style." He admits that the Hellenic style appears to us to be, within its limits, one of extreme refinement, "and perhaps seemed so to those who originally practised it." The reader should note the significance of that "perhaps," and the extent of the questions it lays open. That is a remarkable sentence, and deserves to be pondered. It might be applied to Greek sculpture also, and the question raised whether what we think so admirable appeared more to the Greeks than an everyday craft practised in the only way in which it occurred to them to practise it. But did Mr. Morris take into account what we now know of the optical refinements of the Parthenon, or is he, possibly, not much acquainted with them? It would hardly seem possible that such care should have been taken to provide accuracy of optical effect unless those who carried out the building attached great importance to it. Still, we must admit the suggestiveness of Mr. Morris's "perhaps." With the view taken of Roman architecture we differ little; it is expressed in a very significant and picturesque manner. "To criticise it from the point of view of to-day would be like finding fault with a geological epoch, and who can help feeling touched by its remnants, which show crumbling and battered amidst the incongruous mass of modern houses?" Yes, or by the Merovingian roofs thatched upon the old stumps of columns, or Goethe's Italian peasant's house nestled among a temple's ruins. In that sense, it is one of the most picturesque and poetic chapters in architectural history; decay has robbed it of its vulgarity, and left only its grander element. Its mischief, in Mr. Morris's view, lies not in its dead remains, but in its modern influence, and perhaps we need not differ from him there. "The New Birth (Renaissance) was bound to the dead corpse of a past art." On every other side men were to look forward to some change, good or bad; on the side of art (or at least of architecture, as we should amend the statement) they were told only to look back. This is true enough, but Mr. Morris, like Ruskin, does not recognise that the Renaissance architects after all did something more than merely look back. Does he mean to deny the existence of any new and genuine architectural element in the Florentine palaces, for instance? That he can see nothing to admire in such a building as St. Paul's he frankly tells us. He has "found it difficult to put himself into the frame of mind which could accept such a work as a substitute for even the latest and worst Gothic building," and he regards St. Peter's and St. Paul's as buildings which "were not built to be beautiful." This view was a popular one in the days of the Gothic revival. It seems to us only an indication of a bounded and doctrinaire view of architecture. Granted that the principles of building in St. Paul's are wrong, and (we should add) that the details are very bad, the grand aspect of the whole is really a refreshing proof that even a false system cannot crush out the genius for great effect in architecture. The details of St. Paul's may be "pedantic imitation;" the whole is a glorious creation; it is Mr. Morris's misfortune if he cannot feel that, and we fear this limitation in his powers of admiration is really the result of social and political feelings—shall we say prejudices—which ought not to interfere with questions of pure art. With Mr. Morris there can be and shall be no art but an art of the people; and Gothic architecture is the architecture of the people, "that uses the hands and wills of men as instruments of creation."

Of the degree of truth and importance in this half-truth much might be said, but we turn to the ostensible reason put forward at the close of Mr. Morris's essay, why we should turn once more to Gothic architecture as a starting point: "An organic style cannot spring out of an eclectic one, but only from an organic one." Why, what did Gothic architecture itself spring out of but an eclectic style? What was Spalato, the first warning of Gothic, but an experiment in eclecticism? Or what was the early French Romanesque, with its odd mixture of reminiscences of Classic detail? On the other hand, it might be argued, with equal plausibility, that you can evolve nothing further out of an organic style which has run its course and come to its decay; unless, indeed, you deliberately choose an earlier period of it and start afresh from that. We have tried that already, and the result has not been a success.

It appears to us that Mr. Morris, in his semi-political doctrinaire view of the matter, ignores the fact that there is a certain amount of work being carried on now, by some of our best architects, which is in the very spirit which he is looking for. A good deal of the Free Classic building of to-day, the best of it, is being carried on with that desire to make the most of the handiwork of the craftsman, in subordination to the general idea of the architect, which was the characteristic of Gothic architecture, and with an attention to the true and workmanlike treatment of detail in relation to the nature of the material, which is quite distinct from that mere paper designing in the office which was the habit of the Classic architect of our earlier days. There appears to us to be a chance of new life for architecture in this direction which there certainly would not be in "trying back again" for a re-development of Gothic architecture; and while dreaming of impossible results from this process, which has been tried and found wanting, Mr. Morris overlooks a more hopeful course which is to some extent actually being taken in hand around him.

## NOTES.

THE special meeting called by the Hellenic Society on the 27th ult. was certainly one of exceptional interest. Mr. Arthur Evans read a paper on a "Mycenæ" treasure found in Ægina, and acquired by the British Museum. A detailed examination of the various objects included in the hoard led to the conclusion that in many particulars this new "Mycenæ" find corresponded to the antiquities discovered in other parts of Europe, and attributed to the late bronze and early iron age—*e.g.*, an open metal-work design representing the familiar scheme of the fowler holding two birds by the neck, was paralleled by designs found in Northern Italy, *e.g.*, near Bologna and Vetulonia, and the pendant ducks and disks appear on the well-tombs of Italy and

Austria, and as far afield as the Caucasus. Mr. Evans's main conclusion was that the Ægina treasure gives additional data for the theory, now fast gaining ground, that "Mycenæan" art and culture was of indigenous growth, though strongly influenced by the East; he further stated that he believed it could be dated as far back as the sixteenth century B.C., its culminating point being in the fifteenth, and its third period lasting down to about 800 B.C. The paper will shortly be published in the Society's journal, when the evidence can be fully weighed. Meantime, we may note that it throws considerable light incidentally on two questions, the early history of Ægina and the origin of the Greek standard of coinage. The famous issue of Pheidon, Mr. Evans believes, was an innovation probably based on Dorian influence —the older standard, ultimately embodied in the Eubœic and Attic coinage, dates, he thinks, back to Mycenæan days. A notable, and, we think, necessary, protest was raised against the narrow local jealousy that would forbid the export of small objects of jewellery and the like from Greece. Such minor antiquities suffer nothing from transportation and were always objects of commerce; as the speaker neatly observed, it is hard indeed if other nations may not collect a few playthings from the cradle of antiquity. After some discussion, in which the speaker's father, Sir John Evans, took part, Mr. Arthur Evans startled the meeting by announcing that on Greek soil he had discovered a new system of hieroglyphics. They were of undoubtedly Greek provenance, and of no known type, either Egyptian, Assyrian, or Phœnician. Can they be of the sort that so sorely puzzled Agesilaos that when he opened the tomb of Alkmene at Haliartos he had to send to the wise men of Egypt to interpret them? Will they throw light on the Pelasgian (?) inscription of Lemnos?

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IT is much to be regretted that the Government has refused to allow the House of Commons to accede to the motion passed in the House of Lords, that a Joint Committee should be appointed to consider the subject of betterment. No doubt the House of Commons came to a decision on the particular Bill of the London County Council which was laid before them, but one of the reasons urged for accepting betterment in that Bill was that it was so infinitesimal in amount that it could hurt no one. As we have over and over again stated, the subject should be settled once for all, and if the principle of betterment is to be applied, it should be applied all round, to improvements in the smallest towns in England as much as to those in the Metropolis. Until a general rule, with the manner of its application, is laid down, if there is to be a tax of the kind at all, there will be constant legislative conflicts over this subject. Thus it is more than probable that if the House of Commons would have agreed to join in the proposed committee, the London County Council might in a reasonable time have been able to insert in their Bills some general provision on this subject. On the other hand, if the committee had come to a decision that though the idea was reasonable, its equitable application was impossible, then the matter would have been at an end. As it is, we may expect the subject to be yet the battle-ground of many Bills.

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THE Select Committee on Railway Rates and Charges have Mr. Shaw-Lefevre's draft report under consideration this week. Sir Albert Rollit champions the cause of the traders, and brings forward some rather drastic recommendations. One suggestion is in the direction of protecting traders against arbitrary and excessive rates of any description—no matter whether they have been advanced, or whether they are or are not within the authorised maximum. It may be urged that the whole of the maximum rates, the fixing of which occupied so much time, would thus be rendered quite valueless. To this it might be replied that they have already been proved of very doubtful value. The attempted enforcement of the new maximum charges at the beginning of the year furnished sufficient evidence that a large proportion of them are quite impracticable, and was, indeed, the cause of the present inquiry. "Reasonableness," without any qualification, is suggested as the test of all railway charges, although it seems highly probable that this would entail further legislation. The Committee is also recommended to express an opinion in favour of the reconstruction of the Railway Commission being included in any legislative measure which may be introduced as the outcome of this inquiry, with a view to the more speedy and effectual settlement of rate disputes in the future. The solicitor for the Midland (Mr. Beale) contended that the companies were already prevented from making unreasonable charges, and that if an independent tribunal were established for fixing rates, it would have the effect of compelling the railway companies to restrict the facilities they at present offered to the public. This would be a matter for regret, but it it were done in a high-handed or wholesale fashion, no doubt the public would speedily take steps to find a remedy. Another suggestion is that on the application of either party to a dispute, the Board of Trade should have discretion to make an order substituting for the Railway Commission either an arbitrator or arbitrators. Sir Albert Rollit never loses an opportunity of endeavouring to extend the principles of conciliation and arbitration—as witness his address to the newly-formed West Ham Chamber of Commerce last Monday—and it is to be hoped that his praiseworthy persistence will meet with a large measure of success.

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THE German Imperial Budget for the financial year 1894-95, which was put before the Reichstag on Monday, contains numerous items for structural purposes. The empire is expected to pay close on ninety million marks, or 4,500,000*l.*, for new buildings and civil engineering, of which sum practically 2,500,000*l.* will pass through the hands of architects, one million and a half through the hands of the civil engineers, and the rest will be disposed of by the railway engineers. The Imperial departments concerned in the expenditure are the Home Office, the War Office, the Admiralty, the Post, Telegraph, and Railway Administrations, and, as is only to be expected in this military country, proportionately the largest figures are for army purposes. The votes are, of course, to a great extent for payments on account, and hence this year's Budget can give but an idea of Germany's actual activity in building. Of monumental works alone there are in hand at present the new Houses of Parliament, costing 1,100,000*l.*, the new Imperial Law Courts, and the new National Monument, each estimated at 400,000*l.*

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WE have so often pleaded for the prompt *publication* of monuments of Greek art, apart from and without waiting for their detailed discussion, that we are glad to know that M. Pottier, of the Louvre, has begun this work in connexion with what he calls the "Documents Céramiques," of the great Campana collection of that Museum. The collection, visited and examined as it constantly is by archæologists from all parts of Europe, still contains unpublished material of great interest. This would scarcely be possible but for the fact that for the most part each vase or terra-cotta has to wait publication till it happens to fit in with or illustrate some theory of the archæological inquirer. M. Pottier now undertakes the reverse method. In a series of papers beginning in the current number of the *Bulletin de Correspondance Hellénique*, he will proceed to make known all the hitherto unpublished vases and fragments which possess any scientific or artistic interest, leaving detailed commentary to others as occasion may arise. Of the seven vases he illustrates we may call attention specially to a cylix of early style (fig. 6), of great importance in relation to the typology of later works. A banqueting scene is represented—five bearded men reclining on couches. One of them is served by an ordinary boy attendant. The other four—and this is the notable point—are provided with crowns and flower sprays by a siren and three winged Erotes. The vase is of interest in relation to the well-known "funeral banquet" scene. In the same number of the *Bulletin* M. Collignon publishes, with commentary, the archaic head (male, he thinks, not female) given recently to the British Museum by Mr. Robert Webb.

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A SHORT paper by Mr. Richardson Evans was read at the Society of Arts on Wednesday evening on "The Regulation of Street Advertising," in the absence of its author, who was unfortunately prevented by illness from attending. The paper was an expression of the views of its author, and of the Society which he has been mainly instrumental in forming, in regard to the necessity of making some decisive stand against the constantly increasing defacement of our cities, and of London more especially, by the prevalence of advertising bills of great size and flaring design. The worst evil of the advertising mania, as the author of the paper would probably agree, consists in the intrusion of the advertiser into the midst of country scenery; but in this case the subject of the paper was intentionally confined to the defacement of cities. This subject we have already brought before our readers on more than one occasion. The most important point brought forward in the discussion which followed was the exceedingly practical suggestion of the chairman, Sir George Birdwood, in regard to the insanitary effect of the great expanses of paper and paste which are spread over every available surface in London in the pursuit of the bill-poster's trade. This side of the matter has not before been prominently mentioned as far as we have noticed, and those of us who are interested in the subject ought to be grateful to Sir George Birdwood for furnishing a new and important argument against the modern excess of advertising, and one which moreover may appeal to the minds of many who are blind to the importance of the subject considered on its merely æsthetic side. Some amusement was imparted to the discussion by the resolute and naïve defence of street advertising on the part of one or two speakers who were commercially interested in its continuance. We may take the opportunity of pointing out that Mr. Caine's Bill for the legal regulation of advertisements, now before Parliament, is not in any way promoted by the "Society for Checking the Abuses of Public Advertising," and is in some respects more drastic in its provisions than the Society would, on grounds of expediency, approve of. The Society in question has its own draft Bill in preparation, of which more will probably be heard in due time.

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MR. WALTER CRANE'S lecture on the Use of Ornament at the Arts and Crafts Exhibition on Thursday evening was a particularly interesting one, and though many of the remarks made were expressive of opinions which Mr. Crane's charming book on "The Claims of Decorative Art" has made familiar, nevertheless the soundness of the opinions cannot be questioned, and their reiteration can only be welcomed. The lecturer accompanied his statement by charcoal sketches, which at once secured the interest of the audience which filled the room. A careful comparison of use and ornament led on to the assertion that these qualities should be inseparable; that the

saying "neither useful nor ornamental," which is too often with truth applied to manufactures of the present day, should lose its significance. The study of the history of ornament shows that its sources are usually of symbolic or constructive origin. The universal appearance of the key pattern which appears in many countries, and from early times till as late a date as 1617, was commented on. The circle, as another universal symbol appearing alone and in conjunction with the former, representing the sun, and its rotation in various combinations. As regards the structural decoration, Mr. Crane explained by sketches many interesting developments of the spiral running pattern, whose origin was traced to the intertwining of the wattle construction; and the knotted and intertwined fringe of plaited mat forms gives rise also to a large tribe of patterns. Thongs and their use in fixing primitive axe-heads to the handles doubtless gave rise to further patterns, and to this is traced by some the zigzag of the Norman arch. The well-known influence of a wooden construction upon Greek architecture afforded other examples of the structural derivation of ornament. The working of metal with the spiral twists of wire and iron is a fruitful source of ornament. Mr. Crane emphasised the point that our designs should be English in the same view as the Persian designs were Persian. Their legibility should be as complete as in the days when books were few, and legends in architecture were read by the masses. Mr. Crane considered ornament as the constructive sense, dominated by a sense of beauty, and, as a distinct means of expression, it should have constructive basis in an architectural sense. A vote of thanks to Mr. Walter Crane for an entirely enjoyable lecture terminated the proceedings.

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THE "Art for Schools Association" is holding a small exhibition at 29, Queen-square, Bloomsbury, of the class of work which it provides at a cheap rate for hanging in schools. These consist mainly of reproductions by photography, photogravure, and other processes, of high-class pictures, ancient and modern, as well as coloured pictures in a conventional decorative style, some of which have been noticed in our columns, and which are specially designed for chromo-lithography. The reproductions by this method of water-colour drawings not specially designed for the purpose are mostly very good, and indicate that the chromo-lithographs have been carefully selected, and that the Association is not likely to recommend or circulate the coarser forms of this rather doubtful process. The prices placed on the works seem very moderate, and the Association is doing well in showing to those interested in the artistic education of the people how examples of what is good in art can be brought before them at a small expenditure of money, if subject and method of producing are judiciously selected.

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OUR attention has been called to an artificial sandstone, made in Germany, which is shortly to be introduced into the English market, we are informed, by Messrs. Peters, Bartsch, & Co., of Derby and London. This material is manufactured at Nieder Ingelheim, on the Rhine, in a rather peculiar manner, and may be briefly described as follows:—The sand employed is obtained from the locality and well dried and screened before being used; it contains from 2 to 3 per cent. of clay. When ready it is placed with a certain proportion of ground lime into an iron drum with diagonal ledges in the interior, which is then closed and slowly revolved by steam power, the materials thus being thoroughly incorporated with each other. The mixture is now taken out and conveyed to an apparatus consisting of a frame of wrought iron, having a flat bed on which moulds are built up. We need not describe the method of making or arranging the moulds, but when the frame is built up it is filled with the mixture of sand and lime, not pressed in by force. Covers are then placed on, everything wedged up tightly, and the frame and moulds are run on rails into a cylinder. The latter is now closed, and water and steam admitted. The water must cover the moulds, and the steam is used at a pressure of about 45 lbs. to 60 lbs. per square inch. The steam forces the water between the crevices of the moulds, the water slakes the lime, causing it to expand in volume, and as the moulds resist the outward expansion, the lime is forced into the sand and cements it into hard stone. The steam pressure is kept up for three days, after which the frame is withdrawn, and twelve hours allowed for cooling before the moulds are taken to pieces, and the stone removed. If stones of different tints are required, the effect is obtained by the use of coloured earth, a small percentage of which is mixed with the sand and lime in the revolving cylinder previously referred to. We have before us the results of some experiments made in England to ascertain the resistance to thrusting stress of six 6-in. cubes of this artificial sandstone, from which it appears that, on an average, three of them, of buff colour, crushed at 196·6 tons per square foot, whilst the remaining three, which were grey, went at 177·6 tons per square foot. These results are compared, though we cannot conceive why, with Monk's Park Bath stone. The two materials have nothing in common, one being, as we know, an artificial sandstone, and the other a shelly oolitic limestone; they are in no wise comparable in the sense implied. If one showed double the "crushing strength" of the other that would be no criterion as to which was the better material. It would be much more satisfactory to compare the results with natural sandstones, or, better stilll, with other artificial sandstones. However, this new German stone appears to be immeasureably superior to some others of its kind that have come under our notice. It is compact, and is not unpleasant to the eye; it has the aspect of some of the lighter natural sandstones, though in composition it is, of course, very different, except that both contain a large percentage of quartzose sand. On testing a sample weighing 338 grains we found that it absorbed 36 grains weight of water in three hours—not an excessive amount. We understand that works will shortly be established in London, and the stone made entirely from materials found in this country.

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THE Standard Electrical Time Recording Company is now showing its system at the company's offices in Westminster. An ordinary pendulum clock is used as the standard or regulator, but instead of the mainspring being wound up in the usual way it is wound up every half minute by a current from two Leclanché cells, which lasts for about one-eighth of a second. The periodic current which winds the regulator can be sent through receivers placed in the various rooms of a building. The receivers look like ordinary clocks, but instead of clockwork an electro-magnetic arrangement is put in the cases which advances the hands by a half minute every time the current passes. It is found advisable to reinforce the current by adding one cell to the battery for each receiver. The current becomes weaker as the cells run down, so, to prevent them being exhausted without due warning, an ingenious "tell-tale" has been devised. Two discs are adjusted to move round equally by ordinary ratchet gear every time the current passes. But to one is attached a stronger spring than the other; when, therefore, the current falls off, its electro-magnet cannot extend the stronger spring to its full extent, and the one disc moves slower than the other. One disc is perforated by two holes, the second, which is placed behind the first one on the same axis, has two red spots painted on it; ordinarily these are hidden, but when the speeds become unequal the spots appear at the holes and thus give the alarm. There are other automatic arrangements used in connexion with the system, among which is an apparatus which can be set to advance or retard the clocks on a ship when travelling east or west. It is estimated that the regulator costs 2s., and each recorder 1s. per annum for battery power, so that the upkeep can be but small.

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THE appointment of the Surrey County Surveyor does not seem a creditable business. The Surrey County Council advertised for a Surveyor, who was to have a salary of 800*l.* a year and travelling expenses, and of course got a very good list of candidates, from whom they selected four, viz.: Mr. A. T. Davis, Shropshire County Surveyor; Mr. de Courcy Meade, the well-known Surveyor to the Hornsey Local Board; Mr. O. J. Sheldon, Essex County Surveyor; and Mr. F. G. Howell, the son of the retiring Surveyor. A member of the Council protested strongly against the inclusion of the last-named candidate among the selected four, on the ground that he was not in any way their equal, and that if the election was to be based on merit, he could not understand how his name came to be coupled with that of Mr. de Courcy Meade. The four names were put, however, and the first voting gave a majority for Mr. Howell, Mr. de Courcy Meade coming next. On these two names being put up for a second voting, the numbers were equal, whereupon the chairman gave the casting vote for Mr. Howell. Now, Mr. Howell may have merits that we do not know of, but Mr. de Courcy Meade has merits that everyone knows of, and was, in fact, a very exceptional candidate. In persisting, in such a case, in electing the son of their retiring Surveyor, the Council can hardly have had the interests of the ratepayers uppermost in their minds, and moreover, in advertising the appointment at all, they have done little better than make fools of the candidates, as it must be pretty obvious that they intended to elect Mr. Howell all along.

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WE have often commented on the absurdly realistic ideas which prevail in England in regard to the treatment of what is supposed to be artistic silversmiths' work. A cruet-stand which has been designed by a Councillor of the new "seaport" of Salford, in honour of the Manchester Ship Canal, and has been executed by Messrs. Elkington, is an amusing example of its class. An artist might find a fine subject for treatment in that; figures emblematic of sea and land, of commerce and shipping, &c. But the English commercial mind takes a more practical view of such matters. The cruet-stand in question is oval in plan. A representation of the Canal, in sheeny surface to represent water, enters at one end and winds about three-fourths of the way round the base; on its bosom rest two silver ships, miniature models, it is understood, of two which will eventually ply on the Canal. Lift off the decks of the vessels, and lo! their holds are filled with salt, and two navvies' spades serve for spoons. At one end of the stand is a lighthouse, which forms the mustard-pot; floating in the Canal at the other end of the stand is a buoy (nearly as big as the ships); this is the pepper-pot. Stretching from the lighthouse is a tongue of land, in which appear the Salford docks. These (unlike the buoy) are of Liliputian dimensions; by no possibility could either of the salt-ships enter them. In the centre is a Brobdingnagian anchor stuck on to serve as a handle. This precious *olla podrida* of absurdities is, we understand, registered as a design! The unfortunate inventor of it has probably not the slightest suspicion that

he has provided a laughing-stock for artists, and that "design" means the production of something which will have decorative effect, not the jumble of imitations of artificial objects without regard even to scale, consistency, or relation to the uses to which they are to be put.

## LETTER FROM PARIS.

As has been already recorded in our columns, the General Committee for the Exhibition of 1900 has ratified the report of M. Picard's Sub-Committee recommending that the site chosen should be the same as that of the 1889 Exhibition, with the addition of a portion of the Champs Élysées, and the quays between the Pont d'Iena and the Pont de la Concorde. It is of no use to dwell now on the criticisms adverse to the scheme, which have had no effect, but which we still hold to have been well founded. In the words of Boileau

"Un dîner rechauffé ne valut jamais rien,"

and it is the same with an "Exposition Universelle." The public wants to see something new. It is apparently the intention to leave competitors for the plan and buildings of the Exhibition free to choose whether or not they will include the existing buildings of the Champs de Mars in their schemes. This is another mistake, for the first condition for giving the Exhibition, under the circumstances, an aspect of novelty, would be the complete clearing away of the structures of 1889, excepting the Eiffel Tower, in regard to which, unfortunately, the State has tied its hands for twenty years. As the jury for the competition will include the architects of the principal structures of the 1889 Exhibition, it is to be feared that their natural partiality for their own works will incline them to favour the schemes which will leave these intact, and in such a case the future Exhibition will hardly be worthy of the close of the century or of the artistic fame of Paris.

The General Committee is also occupied with the question of transport. Everyone will remember the difficulties which the visitors to the last Exhibition experienced in getting to the Champ de Mars, and still more in getting back from it; difficulties which certainly reduced the number of entries. As it is to be supposed that the visitors of 1900 will be still more numerous, it is important to obviate any recurrence of this drawback; and if the continually-promised metropolitan railway is not provided by 1900, it will be requisite to prolong certain lines of railway further into the centre of Paris, and thus to develope the existing incomplete means of locomotion.

Some progress is being made in this respect on the left bank, where the works for the prolongation of the Sceaux railway are being pushed forward vigorously. While the subterranean road is in process of formation, the terminus at the angle of the Boulevard St. Michel and Rue Gay Lussac is being prepared by the transformation of an existing mansion in flats into booking-offices and "salles d'attente." In the cellars of this building the approaches to the railway will be formed, with the offices on the ground-floor, while the upper floors will still remain as private dwellings. This arrangement, which is a rather startling innovation on Parisian habits of living, has obliged the Orleans Railway Company to take special precautions to secure good ventilation of the lower stories by extract tubes, which will be masked as kiosques. A powerful ventilating fan placed in the basement will draw out the contaminated air, and expel it through a high chimney. The stations of Boulevard Port Royal and Place Denfert-Rocherau are also in process of construction. The first will be a light construction forming a shelter to the arrival and departure staircases, and giving access to a footbridge on which the booking-offices will be formed. Here the work proceeds without opposition, but this is by no means the case with the projected station at the Invalides, to which strong objections are being raised. The "Comité des Monuments Parisiens" has opened fire. Next came the "Société Centrale des Architectes," which has published a protest signed by M. Daumet. The "Association Amicale des Architectes Diplomés" has addressed a similar protest to the Minister of Public Instruction. So the matter rests at present. It remains to be seen whether æsthetic considerations will gain the day.

It is nearly a year since the committee for the decoration of the Hôtel de Ville has held a meeting. It was considered advisable to leave the artists a little breathing-time, in the hope of their accomplishing something really important. Last week the committee was able to form a judgment on the progress of the work undertaken by M. Jean Paul Laurens in the Salon Lobau, and that of MM. Picard and Risler in the gallery next to the Salle des Fêtes. The third panel executed by M. Laurens, representing "Louis le Gros donnant aux Parisiens leur première charte," has been much appreciated; it is clear and harmonious in colour, with a great deal of life and spirit. It shows a kneeling crowd around the royal throne, which is surrounded by grim-visaged nobles and austere ecclesiastics. It is a great improvement on the two preceding works, "Étienne Marcel protégeant le Dauphin" and "Louis XVI. à l'Hôtel de Ville"; and one reason for this may be found in the fact that in this case, after the first studies were made, the artist painted the picture directly on the wall, under the actual conditions of light to which it was to be permanently exposed, and not in the artificial light of the studio. MM. Picard and Risler, whose work includes fifteen cupolas and two hemispherical niches, have already executed—also directly on the wall—five cupolas, adorned with very pretty figures of women and children playing in a kind of dream landscape amid spring flowers. The committee has been exceedingly well satisfied with the work of these young artists, who have succeeded in imparting to allegorical painting a new and essentially modern spirit. It is to be hoped the Committee will be equally fortunate in its further selection of artists. Besides the work already commissioned, place has been found for M. Chéret, the decorative artist, and M. Forain, the caricaturiste. The first is to make the cartoons for the tapestries for a small drawing-room, to be carried out not at the Gobelins, but at a private manufactory. M. Forain, whom one never expected to see engaged on the official decoration of a palace, is to paint the walls of the refreshment-room of the Municipal Council. If this school of art is to be introduced, why not go further, and give M. Willette a turn? The competition system, which produced no good result except in the case of MM. Picard and Risler, is now at a discount, and the Council, who at first would have nothing but competition, now evidently prefers giving direct commissions, and this course will probably be taken in regard to the decoration of the Council Library, and that of the "Grande Salle de Budget." For this latter there is talk of employing mosaic, or else wood-inlay combined with ceramic decoration, a combination which has not yet found place in any portion of the Hôtel de Ville decoration.

At the Mairie of the IV$^{e}$ Arrondissement the large decorative design undertaken nine years ago, as the result of a competition, by M. Léon Comerre, has been lately completed and fixed. The work, which has cost 50,000 francs, consists of fourteen allegorical subjects in panels. The last of the series symbolises "L'Étude des Lettres et Sciences."

The "Union Centrale des Arts Décoratifs" has just given judgment on a rather interesting competition in electric light burners, &c., goldsmiths' work, and artistic binding. Industrial art is taking a more and more important place at Paris. The Municipal Council occupies itself much with this subject, and intends to organise at the Musée Galliera, a complete museum of art applied to industry. M. Carabin has just executed the model for a case of very original design for the central hall of this Museum, which will in itself be an interesting specimen of wood-carving, with caryatide figures and finely-decorated panels. We have also seen the studies for some curious bindings ordered for this Museum, from MM. Prouré & Wiener, and some stoneware by M. Delaherche, which is also destined for it, and reliefs in pewter by M. Desbois. In fact the Musée Galliera seems likely to become a serious rival to the Musée des Arts Décoratifs, which rather suffers from the want of a definite aim and intelligent direction.

The season of small exhibitions has commenced. At the Georges Petit Gallery is the "International" exhibition of painting and sculpture, among which the most noteworthy works are those of MM. Dagnaux, Boucher, Laurens, Drousseaux, Carrier-Belleuse, &c. At M. Durand Ruel's gallery M. Ganguin, after a long absence from Paris, is exhibiting a series of studies at Tahiti which are clever and interesting. M. James Millet, the landscape and animal painter, exhibits at 18, Rue Louis le Grand, a small collection of pictures of considerable merit.

The Cluny Museum has come into possession of a curious carved ivory triptych of the fifteenth century. It belonged to a provincial church in a dilapidated condition, which gave it up to the State in return for work of reparation to the church. Japanese art has made its official entry into the Louvre, where a room has been opened specially devoted to Japanese work—watercolour drawings, pottery, sword-hilts, &c.

It is announced that the Panthéon decoration commenced by the late Elie Delaunay is to be taken up and completed by his favourite pupil, Georges Desvallières. The work consists of a series of paintings illustrating the history of Ste. Géneviève, the patron saint of Paris.

A statue of Condorcet, by M. Georges Perrin, is soon to be added to the list of public statues of Paris. It is to be set up on the Quai Conti, between the Hôtel des Monnaies and the Bibliothèque Mazarine. On the other side of the Seine is the Raffet Monument recently inaugurated, the white profile of which now stands out in front of the Louvre. At the foot of a marble column supporting a bust of Raffet, is attached a trophy of arms and flags and the Imperial eagle. At the left of the column a drummer of Voltigeurs of the First Empire beats the charge furiously; the figure reminds one of the drummer in Raffet's celebrated composition—

"Le grand revue qu'à l'heure de minuit
Passe, aux Champs Elysées, César decédé."

This figure is very fine, and happily breaks the otherwise rather too meagre lines of the monument.

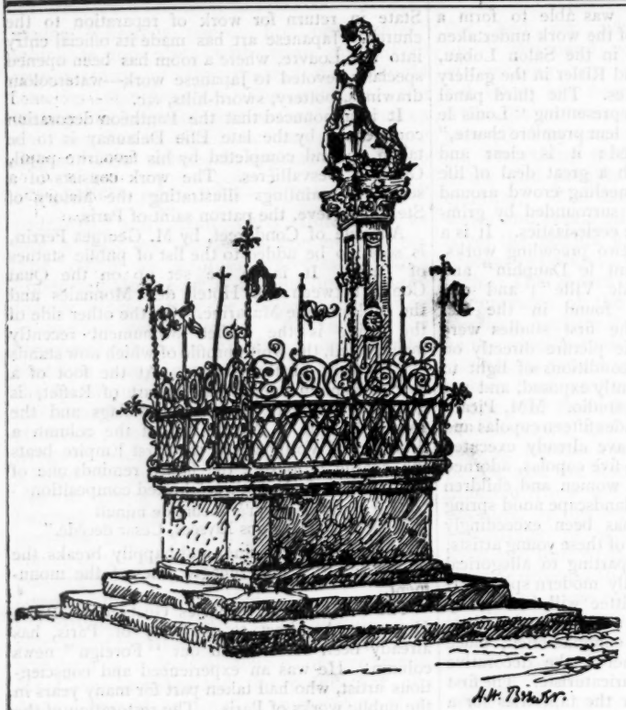
The death of M. Charles Gustave Huillard, Honorary Architect to the City of Paris, has already been recorded in our "Foreign" news column. He was an experienced and conscientious artist, who had taken part for many years in the public works of Paris. The restoration of the Tour des Ducs de Bourgogne was the principal object of his attention during recent years; a design for this, which he made, received a medal in the Exhibition of 1878. Economic considerations, and the absolute indifference of the Municipal Council, prevented the realisation of this scheme, and perhaps in part the opposition of M. Alphand, who, with all his administrative faculties, as an engineer had little love for architects, especially for those who showed any independence of opinion or action. There is no doubt that the failure to see this scheme realised was a subject of great vexation to the late architect. M. Huillard carried out the construction of the group of school buildings in the Rue aux Ours, the side portal of the Église St. Roch, and the new Salle des Mariages at the Mairie of II$^{e}$. Arrondissement. It may be added that Huillard, who died at the age of 69, had been one of the ablest pupils of Baltard. He obtained a third medal at the Universal Exhibition of 1878, a bronze medal at that of 1889, and the Cross of the Legion of Honour in 1892, on his superannuation retirement from service.

## ON VARIOUS TYPES OF FOUNTAINS.

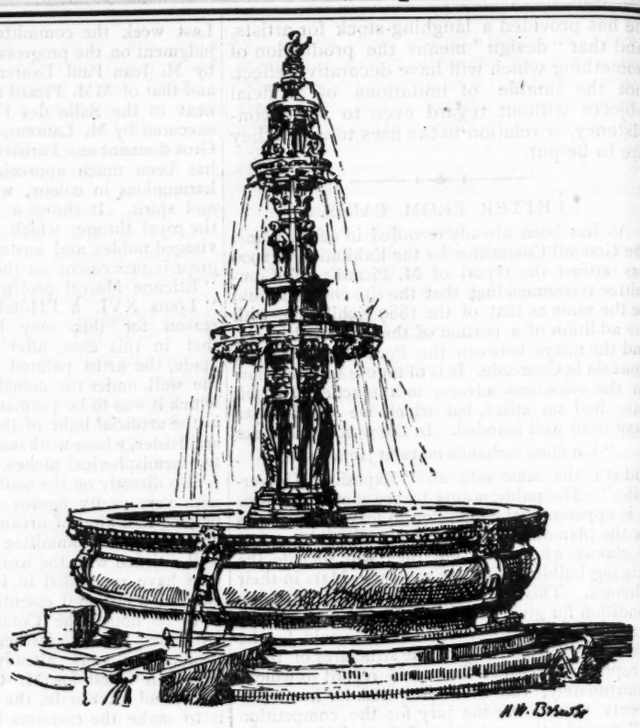
IT is not strange that in ancient times, all through the Middle Ages, and even down to our own day, fountains and springs have been regarded with a feeling akin to veneration. The pure water gushing out from the rock, or rising up from the soil, instinctively appeals to the mind as a direct gift from the Almighty uncontaminated by the hand of man, and its refreshing and cleansing attributes give us such an extraordinary emblem of purity and repentance, that it is in no way astonishing to find temples, churches, shrines, and other religious structures erected either over or in their immediate proximity.

The scriptural term "a fountain of living water," supplies us with another emblem, that of life, and there is, perhaps, scarcely a great poet who has not used this figure or symbol. In the earliest times, no doubt, the word "fountain" meant simply a natural spring, but later on it was used to denote the basin in which the water from the spring was collected, and from this it became by degrees to be rather disassociated from its original meaning, and confined almost to suggesting a mechanical contrivance which squirts out water into a basin or series of basins.

Fountains would seem in early times to have consisted of an aperture in a wall, which spirted the water into a basin or pond; but later on these apertures were placed in a centre column or spinal structure. Of course, in the former case, the water flows down from its own level through the aperture into the basin; in the latter, the water has to ascend to the various apertures and then again descend through them, which is done by the fountain being fed by water at a higher level, or forced into the column by some mechanical means—hydraulic pressure, for in-



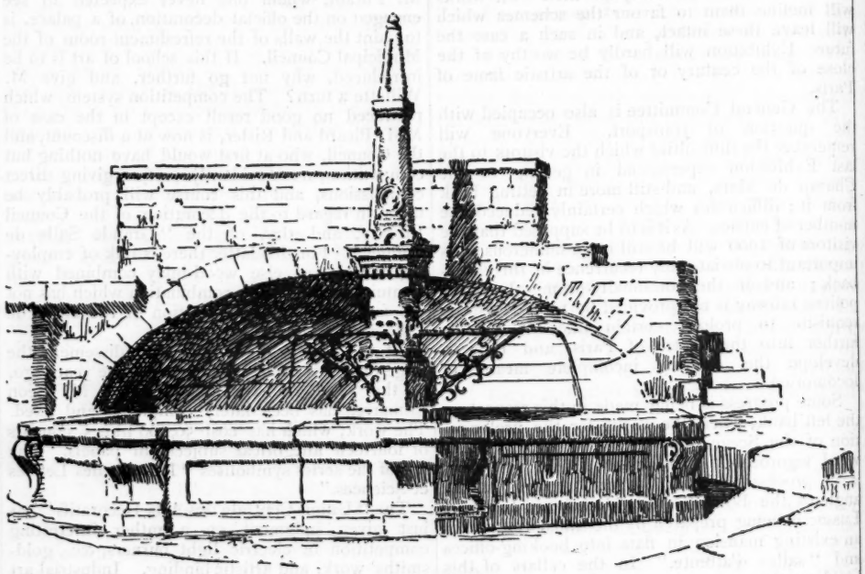
*In the Fish-market, Ratisbon.*



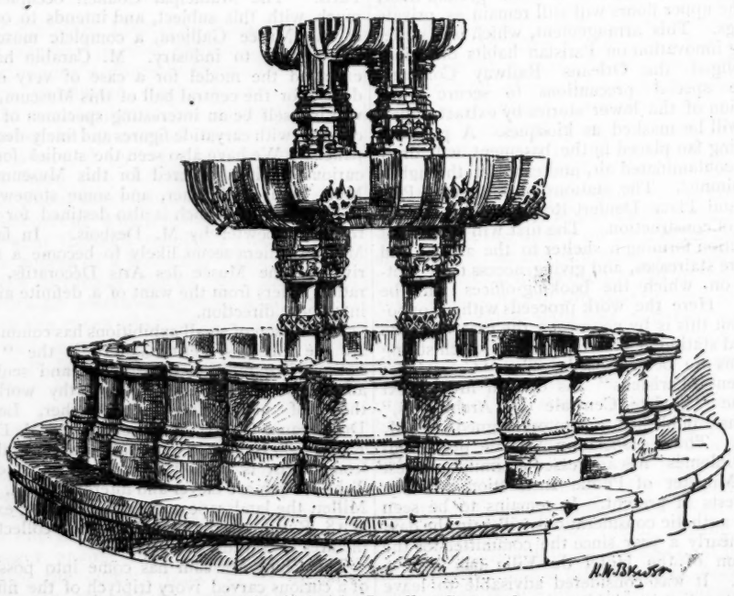
*St. Jean de Doigt, Brittany.*

stance. It seems impossible to suppose, as some scientific writers have maintained, that the ancients and Mediæval men, who were so skilful in the arrangements of their fountains, were unacquainted with the fact that water will find its own level; and the proof advanced that they erected aqueducts, where such works could have been dispensed with, is insufficient and unconvincing, because there are many advantages possessed by aqueducts over underground pipes, which need not be discussed here. As I have already pointed out, two ideas of the arrangements of fountains were common in ancient times, and all departures from these two ideas are more or less unsatisfactory. The more complicated kind of fountain, it appears, should always consist of a large basin or pond, and a spine or column, which squirts out the water and supports the smaller basins; sometimes a canopy covers the whole structure, an arrangement which has its advantages in the streets of towns, where it is advisable to protect the water from gusts of wind, which would otherwise prevent the streams falling into their proper basins, and blow them out on to the pavement, creating puddles and muddy swamps, such as may be seen on any windy day in Trafalgar-square. Two fine examples of canopied fountains of almost contemporary date are to be seen in the market of the Innocents at Paris, and the great court of Trinity College, Cambridge. The former is a work of the celebrated Jean Goujon, and the latter probably by Ralph Simons. The French fountain is crowned by an oblong canopy adorned with pediments and pilasters; but the English example has an octagonal canopy, supported on columns. In general effect and outline it is quite equal to its French rival, but no comparison whatever can be instituted between the sculpture and the workmanship of the two, because, like most English works carried out at the close of the sixteenth century, the sculpture of the Cambridge fountain is coarse and barbarous; whereas the water-nymphs filling in the panels of Jean Goujon's fountain are amongst the noblest works ever produced by the sculptor's art of any age.

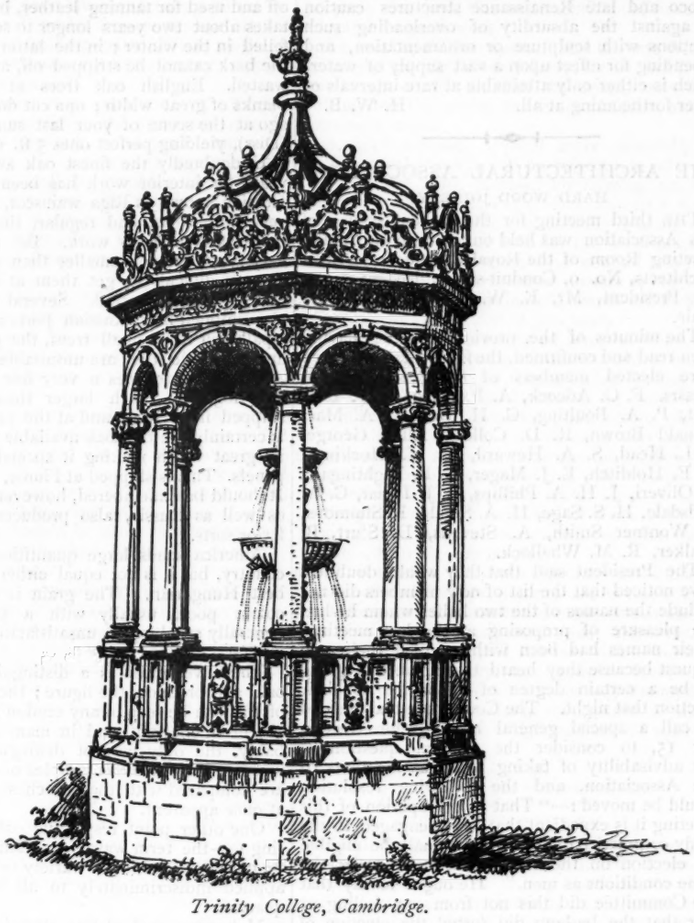
It will be noticed that in nearly all the examples which we illustrate the spine or column is very slight and delicate; it is true that in the Batalha example, owing to the great size of the upper basins, a considerable amount of support was necessary, but in order to obtain this instead of converting the spine into a cumbersome mass of masonry, it is made to consist of four columns below and four pinnacles above. It is very unfortunate that this splendid work, which stands in the cloisters of the famous Portuguese monastery, has either never been completed or its top feature has been destroyed. Probably these four pinnacles, the bases of which alone exist, supported a small canopy. The design of the



*At Esslingen.*



*In the Cloisters, Batalha, Portugal.*



*Trinity College, Cambridge.*

whole bears some resemblance to the famous fountain of Perugia, and also to the Moorish one in the Alhambra.

To show how very delicately the spines of early fountains were treated both in Gothic and Early Renaissance, look at the examples from the Cathedral of Frieburg in Bris-gau, and that of the churchyard of St. Jean de Doigt, in Brittany. The former stands at the back of the high altar, and is most probably the work of

*"Schatzbehalter" (1491).*

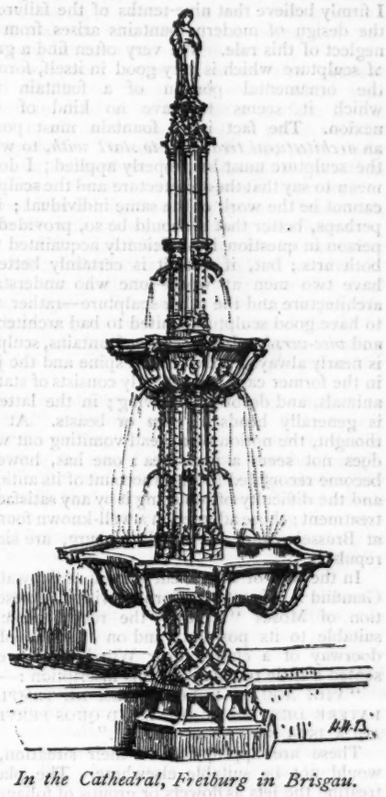
Hans Meisenberger, of Gratz, who erected the choir of the church between the years 1471 and 1513; it is of red sandstone. As it is inside the building, its designer had not to take into consideration any troubles arising from the weather, wind, &c., so that he has kept his basin smaller than usual, and the spine exceedingly delicate. The flow of water is small, and in order to make the most of it, the heads which squirt out the water have metal-pipes inserted into their mouths, a treatment which is very common in Mediæval examples, and one which has the great advantage that it prevents the water dribbling down and staining the stone-work. Considerable similarity will be noticed between the treatment of this fountain and that copied from a singular illustration of the Garden of Eden in the "Der Schatzbehalter," a work published in the year 1491, illustrated with coloured engravings by Wohlgemuth, a copy of which is in the possession of the writer. The great difference between this and the Freiburg fountain is that it has only one basin, from which the water is discharged on to the ground, but this is done because it is intended to represent the spring which fed the four rivers which watered Paradise, which are called in "The Vulgate," Phison, Gehon, Tigris, and Euphrates; in the English Bible the second river is called Gihon and the third Hiddekel.

The fountain at St. Jean de Doigt is chiefly composed of lead; it is a very elegant structure, exactly following the Mediæval plan.

The little fountain at Zell, near Würzburg, and that in the fish market at Ratisbon, are very pretty examples of the spine being placed at one side and not in the centre; they have no basins, but only the pond. I very much regret to say that the charming metal grill which surrounded the Ratisbon fountain has been removed since I made my sketch, but the destruction of old fountains which has recently taken place in Germany has been so mischievous in its results that in a few years it is doubtful whether any will be left. Some years back I saw a fountain at Würzburg that had been immortalised by Prout, pulled down, and replaced by a cast-iron pump, designed in what the Germans called the "Byzantine style."

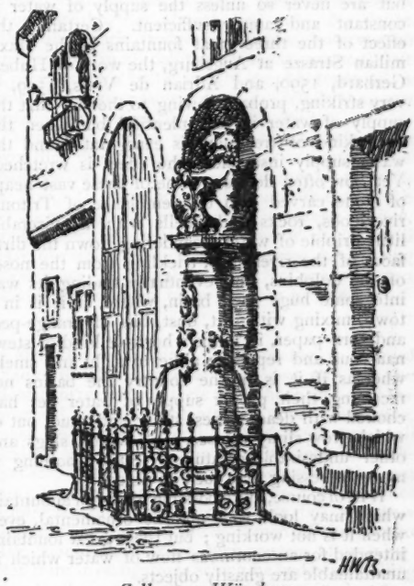
The fountain at Eszlingen is of a very common form, but has the peculiarity about it, that a lane, leading to an upper part of the town, is carried across it, and this difficulty has led to a very pretty arrangement. Of this class of fountain, very charming examples are to be seen in the market places of Ratisbon, Hildesheim, &c.

In Late Renaissance or rococo fountains the idea of the thin spine is more or less departed from, but I venture to think the result is less satisfactory than where the earlier treatment is followed. Of course, to a certain extent the size of the spinal column must be in proportion to the flow of water to be ejected; in all good architecture, in fact, the support must be in proportion to the work it has to do. There is no doubt that fountains like the Pauline at Rome, where the water rushes out in great volumes, are very striking, but it may be questioned whether works of this kind are not rather to be regarded as artificial cataracts than fountains, like the



*In the Cathedral, Freiburg in Brisgau.*

works at St. Cloud, Chatsworth, &c. I cannot help thinking, however, that there is something very unsatisfactory in constructions of this kind, unless the water supply is constant and sufficient. To see a vast fountain or artificial cataract which only "plays" for about half an hour during the day, and for the other twenty-three and a half hours is a series of wretched puddles or a miserable dribble, is employing enormous



*Zell, near Würzburg.*

means to achieve a most unsatisfactory result; but this is far too often the case in our modern fountains. Of course, it may be that a fountain has to assume a monumental character, and must be an important structure, but it does not from this fact follow that it should be arranged for an enormous supply of water which is rarely, if ever, forthcoming. One of the largest and most important Mediæval fountains, the famous Schöne Brunnen at Nuremburg, by Ulman Stromer, 1385-1396, is treated as a kind of memorial cross with a fountain, the fountain portion being quite a secondary business, yet the

result is perfectly satisfactory. It may, in fact, be regarded as an example of the canopied fountain to which I have alluded.

I now come to a very important point in the design of a fountain, and that is the application of sculpture. I think one may lay down this rule: "The sculpture must be applied to the fountain, and not the fountain to the sculpture." I firmly believe that nine-tenths of the failures in the design of modern fountains arises from the neglect of this rule. We very often find a group of sculpture which is very good in itself, forming the ornamental portion of a fountain with which it seems to have no kind of connexion. The fact is, a fountain must possess an *architectural treatment to start with*, to which the sculpture must be properly applied; I do not mean to say that the architecture and the sculpture cannot be the work of the same individual; it is, perhaps, better that it should be so, provided the person in question is sufficiently acquainted with both arts; but, if not, it is certainly better to have two men at work—one who understands architecture and the other sculpture—rather than to have good sculpture united to bad architecture and *vice-versâ*. In the earlier fountains, sculpture is nearly always applied to the spine and the jets; in the former case, it frequently consists of statues, animals, and decorative carving; in the latter, it is generally heads of men or beasts. At first thought, the notion of a head vomiting out water does not seem a nice idea; one has, however, become reconciled to it, on account of its antiquity and the difficulty of replacing it by any satisfactory treatment; those adopted in a well-known fountain at Brussels, and one at Nuremburg, are simply repulsive.

In the wall of a rock-cut church at Schwabisch Gemünd is a fountain adorned with a representation of Moses "striking the rock," which is suitable to its position; and on the side of the doorway of a church near Würzburg is represented a little temple with this inscription:—

"VIDI AQUAM EGREDIENTEM DE TEMPLO A LATERE DEXTRO, ET OMNES AD QUOS PERVENIT AQUA ISTA SALVI FACTI SUNT."

These are appropriate to their situation, but would not be suitable elsewhere. The plan of treating the jets as flowers or groups of foliage has sometimes a pretty effect, where the flow of water is small, but cannot be used where it is large. In many of the large rococo fountains, Tritons, fish, shells, and rocks squirt out the water, and sometimes it is made to flow over the basins from invisible apertures; a plan probably adopted from the old "sweating fountains" of antiquity, such as the "Meta Sudens" at Rome.

Sometimes these arrangements are effective, but are never so unless the supply of water is constant and amply sufficient. Certainly the effect of the three great fountains in the Maximilian Strasze at Augsburg, the work of Hubert Gerhard, 1590, and Adrian de Vreis, 1599, is very striking, probably owing to the fact that the supply of water is very plentiful, but when the same kind of treatment is exaggerated and the water supply insufficient the effect is wretched. Yet how often do we see one of these vast heaps of stone carved into the semblance of Tritons, river-gods, rocks and shells with a miserable little dribble of water meandering down the dirty faces of the river-gods, trickling from the noses of the dolphins, and eventually finding its way into some huge shell basin, where, if it is in a town, mixing with dirt, dust, bits of orange-peel and torn paper, it forms a horrible kind of stew, nauseous and repulsive alike to sight and smell, whereas if it is in the country the basins not receiving their proper supply of water get half choked with dead leaves, straw and mud, out of which grow slimy mosses, rank weeds, slugs and other undesirable creatures. Surely nothing is more depressing than such an object?

It is, of course, quite possible to design a fountain which may look well and be ornamental, even when it is not working; but these great fountains intended for an enormous flow of water which is unattainable are ghastly objects.

Many Renaissance fountains have no sculpture about them, and depend entirely for their architectural effect upon the elegant contour of their basins. These nearly always look well, and are far better than works overloaded with bad sculpture and inferior carving. In fact, in designing a fountain the end and object of the structure should never be lost sight of, and nothing should be attempted where the means are inadequate. The Renaissance and Mediæval designers show how a small supply of water may be economised and yet a thoroughly satisfactory effect be obtained. They also show us how with little or no sculpture, but by simply studying elegance of form, a graceful fountain may be designed; whereas the rococo and late Renaissance structures caution us against the absurdity of overloading such erections with sculpture or ornamentation, and depending for effect upon a vast supply of water, which is either only attainable at rare intervals or never forthcoming at all. H. W. B.

## THE ARCHITECTURAL ASSOCIATION.

### HARD WOOD JOINERY.

THE third meeting for the present session of this Association was held on the 24th ult. in the Meeting Room of the Royal Institute of British Architects, No. 9, Conduit-street, Regent-street, the President, Mr. E. W. Mountford, in the chair.

The minutes of the previous meeting having been read and confirmed, the following gentlemen were elected members of the Association:—Messrs. F. G. Adcock, A. F. Allen, J. T. Bennett, P. A. Boulting, C. H. Bressey, A. MacDonald Brown, R. D. Collard, Allen George, F. L. Head, S. A. Heward, E. M. Hockings, G. E. Holditch, E. J. Mager, A. E. Nightingale, F. Oliveri, J. H. A. Phillips, E. J. Pullar, C. A. Ridsdale, H. S. Sage, H. A. Smale, L. Simmons, C. Wontner Smith, A. Stevens, D. Sturt, B. Walker, R. M. Whellock.

The President said that they would doubtless have noticed that the list of new members did not include the names of the two ladies whom he had the pleasure of proposing at the last meeting. Their names had been withdrawn at their own request because they heard that there was going to be a certain degree of opposition to their election that night. The Committee had decided to call a special general meeting for December 15, to consider the general question of the advisability of taking ladies as members of the Association, and the following resolution would be moved:—"That in the opinion of this meeting it is expedient that ladies engaged in the study or practice of architecture shall be eligible for election on the same terms and under the same conditions as men." He ought to say that the Committee did this not from any feeling or fear that the by-laws did forbid the election of ladies. So far from that being the case they had the authority of those who drew up the by-laws to say that when they were drawing them up with the aid of counsel, the counsel asked them especially if they wished to forbid the election of ladies, and he told them that if they did wish to prevent the election of ladies they must add something to the by-laws, because at present there was nothing to prevent it. That did away with one objection he had heard. The others were hardly worth considering, he thought. He had spoken to a great many of the leading members of the Association, and he thought that all agreed with him that the election of ladies was most desirable from all points of view.

### *Hard Wood Joinery.*

Mr. H. W. Barnes then read the following paper on "Hard Wood Joinery."

Probably modern hard wood joinery would have been a better title for the present paper, as at the request of your President, it deals more especially with this branch of the subject, Mediæval work only being referred to incidentally; cabinet-making, intarsia, &c., are also outside its scope, as they are really distinct trades.

Hard wood joinery may be considered from various points of view, from the elaborate vaulted canopies of a cathedral worked almost entirely by hand, to the simplest domestic fitting, now produced to a very great extent by machinery, but each giving scope, in a greater or lesser degree, for the skill of the workman.

For its production, if the work is to be really good, two things are absolutely essential—good workmen and good, well-seasoned wood, for it is as impossible for a good workman to produce satisfactory work with bad material, as it is for an inferior workman to turn out creditable work, however good the material may be.

A short review of some of the hard woods more generally used may therefore be of interest at the outset.

Oak seems naturally to take precedence, and of this there are several varieties—English, Russian, Hungarian, and American being the principal; of these English still stands unrivalled for strength and durability under exposure, but it has been superseded to a very great extent for internal fittings by the others, which are easier to work, and from their milder nature less liable to twist or crack; English oak trees are usually felled early in the year, when the sap has risen, on account of the value of the bark, which is then easily stripped off and used for tanning leather, but oak so felled takes about two years longer to season than that felled in the winter; in the latter case, however, the bark cannot be stripped off, and is therefore wasted. English oak trees at times produce planks of great width; one cut down some years ago at the scene of your last summer excursion (Diss), yielding perfect ones 5 ft. wide.

Undoubtedly the finest oak available of late years for interior work has been the variety of Russian known as Riga wainscot, the grain being very fine, close, and regular, the wood a good colour and easy to work. But the logs, never very large, are now smaller than ever; in fact, it is very difficult to get them at all, the supply being nearly exhausted. Several other kinds are also shipped from Russian ports; these are principally cut from small trees, the grain is coarse, and, as a rule, they are unsuitable for good work.

Hungary produces a very fine variety of oak. The logs are much larger than any formerly shipped from Riga, and at the present time this is certainly the best oak available in any quantity, its great width making it specially valuable for panels. This is shipped at Fiume, in the Adriatic. It should be remembered, however, that Hungary, as well as Russia, also produces some very inferior sorts.

America sends large quantities of oak to this country, but it is not equal either to Riga or the best Hungarian. The grain is very open, the colour poor, usually with a pink tint, and, generally speaking, is unsatisfactory for high-class work.

The silver grain is a distinguishing feature of oak, and produces the figure; the radiating lines of this can be seen in any section; these lines are absent in chestnut, and in many cases form, probably, the only way of distinguishing the two woods; if the various samples of oak before you are compared with that of chestnut, this will be at once apparent.

One other point respecting oak is worth referring to—the term wainscot. This does not distinguish any particular variety or locality, but is applied indiscriminately to all logs cut on the quarter.

Mahogany next claims attention, the different kinds varying considerably, that known as Spanish, coming from San Domingo, being the most valued. In the past this has been extensively used, but is now very scarce, its place being taken by another Spanish variety, found at Cuba, which is very close-grained, hard, and of good colour; but the kinds more generally used at the present time are obtained from Tobasco and British Honduras; Panama and Africa also send mahogany to this country, but the quality of both is very poor.

Of walnut, five descriptions deserve notice, Italian coming first, both for closeness of grain and beauty of markings. This is difficult to obtain at the present time, but a variety much resembling it is now imported from Circassia. English is lighter in colour and not so richly marked. A totally different kind, known as black walnut, is shipped at Quebec; it is much softer than the others and almost devoid of markings, but can be obtained in large sizes and is not likely to crack. A lighter shade of the same wood is shipped at New York and other United States ports.

Teak is imported from Burmah, and is especially valuable for work exposed to the action of sea air and salt water; it is also coming into very general use for hospital floors; a variety is found at Bangkok, but the colour is not so good.

Many devices have been tried for artificially drying hard woods in a short time, but all seem open to objection of some kind or other, and allowing the wood to season by the natural action of the air on the boards and planks is after all the most satisfactory, although, of course, it is a long process.

But it is time to pass from the material, to the various methods of working it.

Starting at the beginning; the selection of the wood before it is cut to size is more important than appears at first sight, for on this much of the final appearance will depend, and too much care cannot be exercised at this stage, for carelessness in matching will prevent the work ever looking really well, and most likely result in considerable waste.

Cutting to length and width is now done entirely by steam saws, afterwards the wood is passed through a trying-up machine, which planes it to thickness and width, leaving it quite true and ready for moulding; morticing and tenoning are also done by machinery and absolute truth secured; so far machinery is of advantage in every way, and, in addition, it also relieves the

joiner of the very hard labour necessary before its introduction, leaving him free to devote all his energies to the remaining parts of the work, in which a good workman will find plenty of opportunity to display his skill.

Up to this point the preparation of all hard wood joinery is practically the same (nor does it differ materially from soft wood work), but as in its further stages the methods diverge considerably, it will be well to consider these under two broad heads; first, the simpler forms, in which machinery continues to play an important part, and afterwards the more elaborate work, which has frequenty to be done almost entirely by hand.

Formerly mouldings were worked either by planes of various shapes or by routers; the latter were of steel, much the same as modern machine irons, but let into a piece of wood and worked backwards and forwards by hand—a long and tedious process.

The introduction of machinery has, however, done away with both these methods, so far as the ordinary mouldings used for domestic fittings are concerned; in such work the mouldings can and should be turned out in such a manner as not to need touching by hand, and when cost is of great importance, care should be taken that the sections are such as can be worked by passing once only through the machine.

Before further considering the question of sections, and the important bearing they have, both on the appearance and cost of work, it may be of advantage to call attention to the practice followed of cutting boards and planks to the nominal thicknesses of 1 in., 1¼ in., 1½ in., and so on, but as the saw-cut and planing have to be taken out of this, they never hold the full thickness when worked up, 1 in. finishing ⅞ in., 1¼ in., 1⅛ in., 1½ in., 1⅜ in.; therefore (paradoxical though it may seem), it costs more to produce work 1¼ in. thick than 1⅜ in., for 1½ in. boards must be used in each case, but there will be increased labour in reducing them to 1¼ in.; planks also finish about ¼ in. less, and wide English oak ones sometimes even ½ in. less, as, on account of the greater strength of their grain, the latter are more liable to twist in drying; by keeping this in mind unnecessary waste may frequently be avoided.

It should also be remembered that cornices, cappings, and similar mouldings will stand infinitely better if built up, and be far less likely either to twist or crack, than if made solid, the result being better work at less cost; care must, however, be taken that each part is properly tongued or cross tongued; there are several sections of actual work on the table which will show the system fully; attention is specially called to many of these sections, and particularly to the ebony frame, which show what effective mouldings can be obtained from thin material.

Construction, in fact, deserves more than a passing notice, for on it very much depends, and every detail should be carefully thought out. It is difficult to lay down any hard-and-fast rule on the subject, as each work should be considered on its merits, but mortices and tenons are always safe and reliable; in the case of very thick doors, however, it is sometimes desirable to put these double rather than single, to avoid any possible warping of the styles; where, however, mortices and tenons cannot be employed, handrail screws may frequently be used with advantage; dovetails are also very good, but apply more especially to sashes and cabinet making; wall panellings, dados, and skirtings should always be tongued together at the angles and into the floor, otherwise dust will find its way between and underneath them, possibly forming a harbour for the germs of infectious disease. Flooring should be laid in narrow widths and tongued at the joints.

Large columns will never stand if made solid, but will crack and twist out of all shape; if, however, they are made in sections, the difficulty is entirely avoided, the result being very much better work, at no increase of cost, but rather the reverse.

When great strength is required, such as an open timber roof, solid wood must, of course, be used.

The various systems of mitreing next claim attention; in cheap joinery the work is framed up square, and the mouldings mitred in afterwards on the top of the panels; but this method is open to serious objection, the stability of the mouldings depending entirely on nails driven in at an awkward angle, and if these chance to go through the panels instead of into the styles and rails, and the panels shrink, the result will be an unsightly crack; except in the case of tolection mouldings, which can be rebated on to the styles, &c., and properly fastened, this treatment should never be adopted for good work.

An infinitely better system, and the one usually employed in high-class joinery, is to work the mouldings on the solid of the styles, rails, &c., cutting out the styles to receive the rails, and so forming a mitre.

A third method, applied more especially to ecclesiastical joinery, will be referred to later on.

When the work is ready for framing up, it is most desirable to put it together, and let it stand as long as possible, before actually glueing and wedging, as no matter how dry the wood may be, it is sure to shrink when first worked; in fact, there are well authenticated instances of this occurring when re-working old beams which have been in position for 200 or 300 years.

Framing up and cleaning off afterwards are two very important matters; shoulders, which in soft woods need hardly be touched after leaving the machine, must, in hard woods, be gone over carefully by hand, otherwise good results cannot be obtained. Mitres, too, demand very special attention; for all such work the tools differ very materially from those used for soft woods, the most effective having either metal faces or being entirely of metal; in finishing off these tools are also of the greatest assistance, as glass-paper should on no account be used.

But it is when the more elaborate and intricate forms of ecclesiastical joinery are entered upon that the greatest demands are made on the skill of the workman; ancient work was, of course, all done by hand, and still fills us with admiration for its beauty, variety, and general excellence. Evidently in those days time was only a secondary consideration, and nothing was spared to make the work worthy of the high purpose for which it was intended.

> "In the elder days of Art,
> Builders wrought with greatest care,
> Each minute and unseen part;
> For the Gods see everywhere."

Unfortunately, at the present day, time is of so much importance that it is very difficult to devote the same amount of it to any particular work as the old men did; but there is ample proof, even now, that when cost is not the first consideration, work of high quality can still be produced.

Vaulted canopies require much care. These, if of any size, should be built up; if worked in the solid they will crack and twist, utterly spoiling the effect, and in addition be much more expensive; but if the ribs are worked singly, to the required sweep and section, rebated for the spandrels, then mitred together, the spandrels filled in afterwards and the whole covered at the back with strong canvas well glued, they will stand.

Very small and specially elaborate canopies must, of course, be cut out of the solid to a great extent.

The third system of mitreing already referred to (known as mason's mitres) now claims attention. It consists in working the returns of the mouldings in the solid of the styles, to stop those on the rails and on the rails and sills, and to stop the mullions. The actual working of these returns is done after the work is glued up. It is of necessity a more costly method than the others, but there can be no doubt that in such work as that before you (which will show the system clearly) it is the only proper way, and far stronger than any other.

Much old panelling was filled with linen fold-panels, which always look well, and several good ancient examples are before you. These, however, seem to have fallen into disuse, which is to be regretted, more especially as they are really inexpensive, considering the good effect produced, the play of light and shade being very pleasing.

In tracery great opportunities occur, but it is only when cut by hand that all its beauty is brought out, and endless variety can then be obtained. When, however, cost is of supreme importance, the aid of machinery can be called in, and by its use the mouldings worked, leaving only the angles and pockets to be done by hand, and if the cusp points are simply turned out the cost will be still further reduced; in sunk tracery the various sinkings can also be done by machinery; the least expensive section consists of a hollow, a second member, more especially if it is a bead, considerably increasing the labour.

How to treat the face of hard wood joinery frequently requires much consideration and deserves a passing notice. In the case of oak, the action of the atmosphere would tone it down admirably; but this takes time, and the first appearance of newness is often removed by the fumes of ammonia, which can be regulated to produce any desired shade, and the treatment is a good one when the work is not subject to much handling; where it is, however, beeswax and turpentine are generally applied afterwards, as otherwise the damp heat of the hands will leave dark marks; care must, however, be taken that as much of the wax is rubbed off as possible, or the work will very probably turn yellow in time. After this application the oak will cease to darken, as the wax fills up the pores, and prevents any further action of the air.

Beeswax and turpentine alone also produce good results on most hard woods when well rubbed in, and a very pleasant surface is the result, much the same as the slight polish seen on an egg-shell. This treatment is also particularly useful for floors, these, however, require periodical attention. Simple oiling is never satisfactory.

French polishing is a very general treatment, but is too well known to need any description.

It is of the most vital consequence to remember that damp plays havoc with seasoned woodwork, causing it to swell and warp, it is therefore fatal to put it against damp walls; when it is impossible for these to have time to dry, the wood should be well coated at the back with a damp-resisting preparation, and not be fixed close against the wall.

Hard wood joinery is a dry subject—in fact, so essentially a dry one and affords so little opportunity for making a paper on it attractive, that it is much to be feared the present one has caught the infection and become in its turn thoroughly dry; still hard wood joinery is a matter which deserves some attention, and possibly the facts placed before you may induce a further study of the methods of working, which will certainly prove useful.

The introduction of machinery, although materially reducing the cost of production, has not by any means done away with the necessity for skilled workmen; skill, however, can only come by practice following long and careful training, and in some respects the two essentials requisite for thorough work, good workmen and good materials, bear a strong analogy in the careful preparation both require: the forest may contain the finest trees, but unless these are properly converted and allowed to season, much of their value is lost; and a youth may have all the natural qualifications necessary to make a good workman, but without proper training is never likely to reach a high standard of excellence; both the seasoning of the wood and the training of the youth require time—time which may seem at first sight wasted, but is really fitting each to become of real use. It must be a matter of regret to all who have the true interest of the British working-man at heart, that the system of apprenticeship has almost died out. No doubt it entailed much drudgery (this must, however, be encountered in all callings earnestly pursued), but it gave a man a better insight into his trade and a more thorough mastery of all its details than can possibly be obtained by any other means.

Really good men are as much in demand as ever they were, and the more care and attention a man bestows on his work and the greater the skill he brings to bear upon it, the more likely will he be to ensure what every good workman desires, constant employment; and beyond this he will have the satisfaction of knowing that he is doing good work—a satisfaction dear to every earnest and honest worker, be he artist or artisan.

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Mr. Owen Fleming, in proposing a vote of thanks to Mr. Barnes for his paper, said that the close contact of architects with those who had the practical working of materials under their care, must, he was sure, tend to further what they all desired, and that was the improvement of workmanship generally. He had listened with great care to what Mr. Barnes had told them about apprenticeship, and he could not but feel how important it was that the workmen of the present day should have some such system of training. But from investigations which he had been making into the training of the working man in London, he was convinced that apprenticeship on anything like a large scale was impossible in the future. He should, therefore, like to ask Mr. Barnes if he could indicate at all the necessary training in the future. He was very glad to hear Mr. Barnes talk so much about machinery. Machinery was now an essential part of most workmanship, and they must investigate the possibilities of machinery if they were to produce work at a reasonable cost and of a satisfactory character. Sometimes architects had to use a wood which should be a hard wood, but they were not able to know the cost of oak or teak. In some cases American white wood had been suggested to him as a substitute. He

should like to ask Mr. Barnes if that wood had really in it possibilities of use. Judging from the specimens exhibited that evening, he almost thought that in joiner's work scribing was a good form of joint. With regard to oak work—not for the best work, but, say, for a window-cill, and so on—one met with a large number of stains and cracks. Were those stains really disadvantageous to the oak except from the point of view of appearance? As to the cost of mouldings, he thought that it was important that architects should take every opportunity of visiting the workshops and talking with the men, and so finding out wherein lay the best possibilities of modern machinery.

Mr. C. Hindley, in seconding the vote of thanks, said, if he might presume to add anything to such an able address, he would direct their attention to what he might call the artful dodges of cabinet makers, and so caution everyone against them. There were many systems of making joints that were quite right to be used in cabinet work, and which were quite wrong in joinery. The right way to fix a moulding on the panel, if it was to be fixed on the panel, and not on the frame, was to screw it behind and groove it, if possible, to the panel; but they would find that a good many people who made those things would either fix it on with glue, and perhaps supplement that by putting a few needlepoints in. There were a good many risks attending such a process as that. He thought Mr. Barnes might have added a little more on the subject of the difference between cabinet work and joinery in framing up a panel, and also something about the glues that were used by joiners and cabinet makers. He thought that joiners generally used the Scotch glue, which was rather heavier, and though the French glue was not so strong—he thought the difference between the breaking strain in Scotch and French glue was, that the former would stand a strain of 3,000 lb. to the square inch, and the latter about 480 lb. or something like that—it was a very good method to combine the two.

Mr. S. B. Beale said that there was one point which struck him that might be discussed, and that was what he might almost call the moral ethics of modern joinery. Mr. Barnes took it for granted that the best way to carry out elaborate joinery work was to build up in sections. Mr. Barnes had shown some excellent examples of old Mediæval work, but they all appeared to be cut out of the solid, and as young architects had, as a first tenet in their creed, to admire everything of a Mediæval character, they were a little astray. According to Ruskin's teaching they ought to make everything as good at the back as the front. When he (the speaker) was told that it was the proper thing to build up a section, he wanted to know whether that was correct in hard wood joinery? Recently he saw the drawings of the newell of a staircase which was designed by a well-known man, and which was to be carried out by a firm which had a great reputation in hard wood joinery. This newell was built up of 30 or 40 pieces. The mouldings were put in separately, and, of course, to the amateur eye, it looked a solid piece of work when finished, and no one could tell that it was made up of those many pieces. They might imagine what would happen in a few years' time when, possibly, the perishing of the glue would make a piece or two drop out of it. But if they had a Mediæval newell, made of good solid oak, they might racket on the staircase as much as they liked without doing any harm. It seemed to him to be a regrettable fact that good hard wood joinery was not turned out in many builders' shops at the present time. There were probably not half-a-dozen shops in London which turned out first-class work, and if they looked for a moment at the causes which had been at work to bring that about he did not think it was a matter for congratulation. It seemed to him that the whole question was one of money. Competition was answerable for a great many things.

Mr. W. S. Weatherley said that with reference to the question of building up, it was common knowledge that in Gothic work in the fifteenth century it was the proper thing to do, and the solid work really died a natural death. There was a matter which rather interested him in hard wood joinery. In external doors of churches, however beautifully they were made and whatever woodwork they might have, whenever they were covered with ironwork, they became, in a short time, covered with inky streaks, owing to the acid of the oak acting upon the iron. It had been suggested as a remedy to use aluminium; but that did not answer. Another suggestion was to have a deposit of bronze upon the iron.

Mr. Max Clarke said that Mr. Fleming had touched on a most important point, and that was as to what was to become of the British workman in the future, and how was he to be educated. The prospect for them, as far as he could see, was to try and get out of London as fast as possible and get into the country, where, although there might be the grindstone to turn for a period, they would have later a chance of exercising their brains, whereas if they remained in town they would be turned into machines from the constant attendance on machinery in shops. With regard to white wood he believed that it was very free from warping, and that it was very good for shop fronts, but for cabinet work he did not think it would be desirable. Oak stains on doors with iron were a very objectionable feature, but it was quite curable by having the hinges of the doors galvanised, and the nails galvanised also before they were put in, and then they could have them blackened after that. That would be a cheaper method than bronzing. With regard to teak it had a most objectionable smell.

The President, in putting the vote of thanks, said that with reference to the building-up question it was to be remembered that it was not the cost of the oak alone that made one use small pieces, but it was that oak in small pieces stood so much better than in large ones. There had been some reference made to Mediæval oak work. Those who went on the excursion last August in Norfolk and Suffolk saw some of the screens—some of the richest he ever saw—where the cuspings of oak were only half an inch thick. It had somewhat of a metallic effect, being so thin, but there was an appearance of richness which could hardly have been obtained by having the cusping cut out of the solid piece of oak. The difference in the quality of workmanship was very noticeable, and that was why he had one great point to pick with the trades unions. They made a great deal of fuss about the men getting their proper wages, and being paid on the recognised scale, but he had never heard that they took any interest in the quality of work turned out. So long as a man received his pay, it did not very much matter what work he did. Mr. Barnes did not refer to one material which took a leading part in modern joinery. That was putty. He had seen pieces of framework, and he might safely say 10 per cent. of it was putty. There was one thing about the pulpit which Mr. Barnes had referred to which he should like explained. At the wish of the donor it was fumigated, and after fumigation the grain was not nearly so apparent as it was before, and it gave a sort of deadness to the thing which was regrettable. With regard to the different kinds of oak, in his opinion there were scarcely any two builders who agreed as to which was the best oak.

The vote of thanks to Mr. Barnes was then put and carried by acclamation.

Mr. Barnes, in reply, said he hoped that his paper might form the starting-point to those who had not given much attention to the subject. He could assure them that if they did they would soon find out how to design mouldings at a reasonable cost, without losing effect, and also become acquainted with the nature of the materials and the possibilities of modern machinery. On the question of necessary training, considering that apprenticeship had gone out, he could only say that at the present time it was one of the great problems of the day, and one which was bearing more heavily on the British workman as time went on; and it would continue to do so unless some satisfactory method could be found out for taking the place of the old system of apprenticeship. Scribing had been referred to; there were cases in which it must be done, but, generally speaking, it was unsatisfactory, as it left a feather edge on the mouldings. With regard to stains, it depended very much what they were. A great many of them were the first signs of decay, which, of course, were objectionable, but when arising from other causes they did not materially affect the stability of the work. Scotch glue might be stronger, but if they used good French glue they would get very good results, and the latter was lighter in colour. Building-up of sections was not advocated in consequence of modern competition, but because it was not only the cheapest, but the best method.

The meeting then terminated.

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Partnership Announcement.—Mr. Morton M. Glover, A.R.I.B.A. (late Glover & Salter), and Mr. Francis E. L. Harris, A.R.I.B.A., have entered into partnership, and will practise at 46, Queen Victoria-street, E.C., under the style of Glover & Harris.

## *ARCHITECTURAL SOCIETIES.*

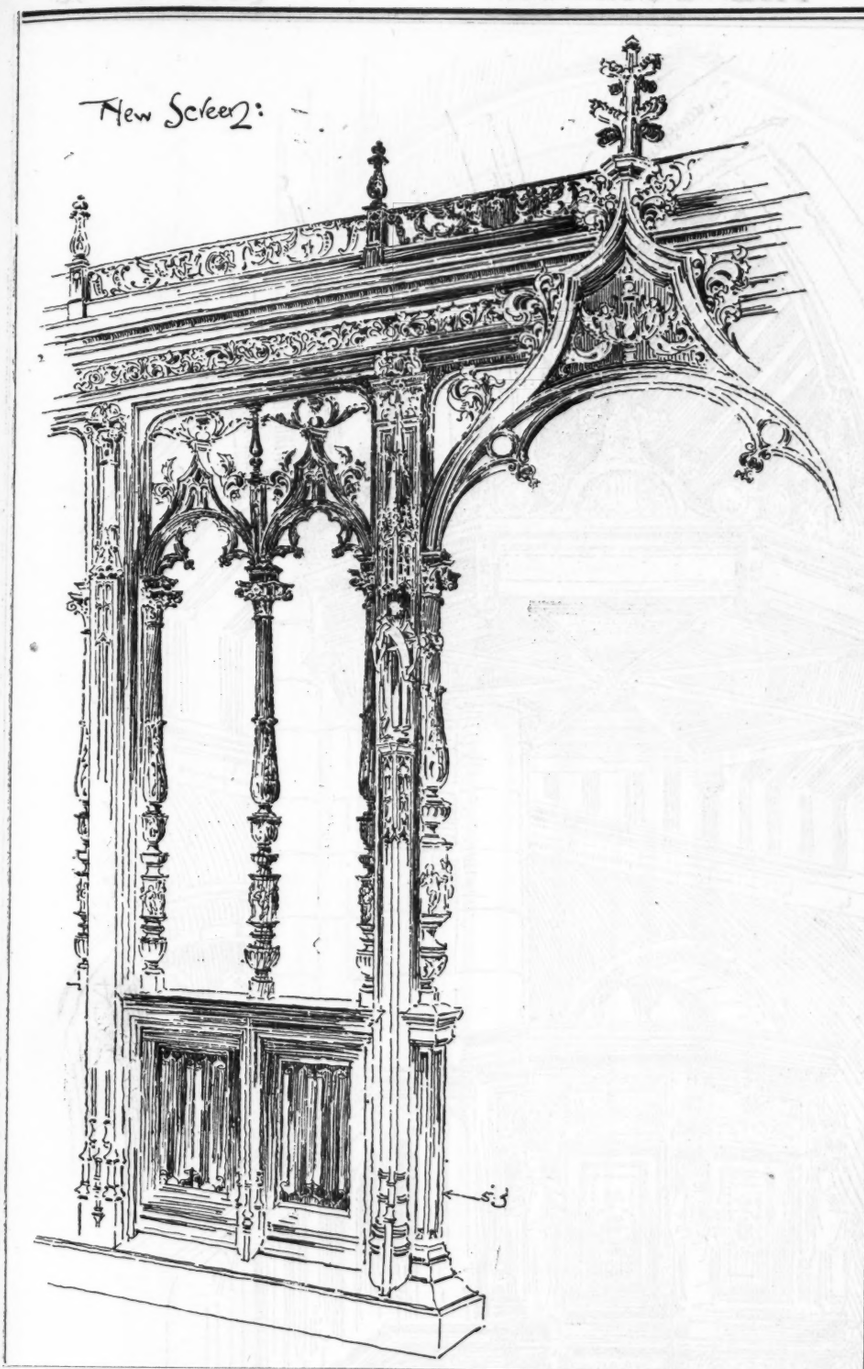
Birmingham Architectural Association.—A conversazione to inaugurate the session for 1893 and 1894 was held on the 21st ult. at the Grand Hotel, Birmingham. Upon the tables and walls of the Windsor room were arranged a collection of drawings and photographs lent by Messrs. Aston Webb & Bell, Ernest George & Peto, Collcutt, Wilson, Hemmings, and Mountford, of London; Messrs. Henman, Newton & Cheatle, Cox, Evans, Swan, Reynolds, Bateman, Mousley, and Harold Baker. There was present a company of about seventy. Mr. John J. Bateman presided in the absence, through illness, of the President, Mr. W. Hale.

Sheffield Society of Architects and Surveyors.—The usual monthly meeting of this Society was held at the School of Art on Tuesday evening. Mr. E. M. Gibbs, President, presided, and a paper was read by Mr. H. W. Lockwood on "Architectural Practice in America." After a short sketch of the history of architecture in the States, an account was given of the present method of training for the profession, which was in the main characterised by the substitution of the student in an academy for the pupil in an office. The main points in the usual academic course were given, much stress being laid upon the open-air work provided in the way of periodical visits to buildings in progress. The extent to which speed, demanded from everybody in the States, has affected the practice of architecture was shown by a lifelike sketch of everyday work in a New York office, with its division and subdivision of work, this departmental system giving speed at the expense of interest. Quantities, as with us, were seldom, if ever, supplied. In very few cases was a clerk of works, as understood here, employed. In consequence of the extra work entailed by this, and some of the legal conditions surrounding the profession, and to a minor extent by the absence of the pupil, the expenses of an office in the States were much greater than those of a similar one here. Some amusement was caused by quotations from a specification written in rhyme, such poetical form having been adopted (on one occasion only) by a New York firm in reply to a complaint that the ordinary specification was dreary reading. Assuming that for an essentially national style, the domestic architecture of a country must be looked to, the "Frame House" was taken as one of the most distinctive of the habitations of man in the States, and its evolution, plan, and appearance were described. The paper closed with an appreciative criticism of the American architecture of to-day, finding in it the defect, especially in church design, of a want of the feeling of reverence, and of an appreciation of the poetical. These, however, would come with experience, and the strength and originality of the work of young America gave sufficient guarantee that these wants would in time be well supplied.

Architectural Section of the Glasgow Philosophical Society.—The third meeting of the Architectural Section of the Glasgow Philosophical Society was held on the 27th ult., in the rooms, 207, Bath-street, when Mr. Malcolm Æ. Macbean, A.M.Inst.C.E., read a paper on "Town Drainage." Dealing with the disposal of sewage, he pointed out that precipitation by chemical agents was the hope of the present, in combination with filtration, &c.

## *ENGINEERING SOCIETIES.*

Liverpool Engineering Society.—The third ordinary meeting of this Society was held on the 22nd ult., Mr. H. Percy Boulnois, M.Inst.C.E., President, in the chair, when a paper was read by Mr. Ivan C. Barling, A.M.Inst.C.E., entitled "The Adjustment of Surveying Instruments." The author pointed out that in a single evening it would be impossible to treat exhaustively of many of the instruments used by the surveyor, so perhaps it would be better to limit the paper to those two most accurate ones which he uses, viz., the Dumpy level and the transit theodolite. In regard to these Mr. Barling observed, among other things, that it was essential that if accurate work was to be done the optical axis of the object-glass must pass right down the centre of the draw of the telescope tube, otherwise when the focus is altered the cross webs will not cut the same point. Probably it would be a good thing if the optician, when making the instrument, could arrange the cell carrying the object-glass so as to accomplish this end.




## Illustrations.

### DUNBLANE CATHEDRAL.*

AT present a special interest attaches to this Cathedral, reopened but a month ago after restoration, when it is almost impossible to avoid making comparison between its former and its present condition, for although carried out on the most conservative lines, the changes effected are considerable; but the more important of these it will hardly be questioned are all for the better. The nave that for nearly three hundred years has been uncovered is now roofed, the windows glazed, and so again it becomes part of the church. The partition wall at the chancel arch is removed, opening up to view the vista of nave and choir so long interrupted.

St. Blane's lacks the variety of style that gives antiquarian charm to most other cathedrals for, with the exception of the tower, the building is of middle thirteenth century date; but what is wanting in this respect is fully compensated for in the excellence of the one style of architecture displayed.

St. Blane, the founder, was connected with, if not a native of the island of Bute, where there is a chapel dedicated to him, of about the same date as the Dunblane tower, that is the beginning of the twelfth century. A contemporary of Columba, about the year 600, he was bishop or prior of a Celtic monastery at Dun Blaan, but no architectural vestige remains of his period, unless the cross, set up in the nave north aisle, be of that age. Thereafter Briton and Norseman in turn ravaged the settlement; still the situation was never wholly abandoned, and ultimately it was occupied by the Culdees, though the particular date of their settlement is uncertain; they appear in Scottish ecclesiastical history with the 9th century and continue till the beginning of the 13th century; the fraternity at Dunblane would seem to have been among the very latest. It was during Culdee rule that the diocese of Dunblane was founded, by David I., the patron of so many Scottish religious houses, in 1140; later, some think, in his successor's reign, and by an Earl of Strathearn. This is not very clear, but it is certain that the heads of that powerful house were the patrons of the See for the succeeding three centuries, until 1442, when the Earldom terminated, passing to the Crown. On the authority of Fordun it has long been held that in 1180, an Earl Gilbert gave a third of his earldom to the bishopric, but if such was ever done, his munificent liberality must somehow have been intercepted, for in 1233 the condition of the fabric was so bad and the service so mean that a new Bishop, Clement, 1233-58, could make complaint to the Pope that the building was roofless, the clergy reduced to one chaplain who but thrice a week said mass, and the revenue insufficient to support the episcopal dignity for six months. The energy of this great Bishop, originally a poor friar of the Order of St. Dominic, is seen in the fact that at his death, twenty-three years later, Dunblane was left a well-organised diocese with the stately building that we have to-day. The Norman tower is supposed to date about 1100 or 1110; what the plan was of the church of that period is uncertain, there is now no evidence to show. There is a door in the north side, and a window to the east; a stair occupies the S.-W. corner. The floor is some 3 ft. higher than the level of the present church. The door has disengaged columns with capitals and bases; the window internally has a hood-moulding, enriched with the zig-zag ornament. In the third story, on all four sides, are small arched openings divided by columns. The stages above this portion of the tower were added in the sixteenth century, the battlemented parapet latest of all, by Bishop W. Chisholm, whose crest is seen on the south side, at which time he also built the parapet of the choir, using throughout the same red stone employed five centuries before by the Norman builder. The total height of the tower is 128 ft.; in the belfry is a bell dated 1612. The two stories under the battlements are of a yellowish sandstone, while the Cathedral as a whole is of grey colour. Why the builders of the nave permitted its aisle to be cut into by the tower, and that at an oblique angle, seems only intelligible on the supposition that the tower was quite detached from the early church that occupied the site of the present choir. The new nave as an extension thereto was built on the axis of the old church, and so its aisles came to enclose partially the tower; that the obstruction was not demolished is remarkable.

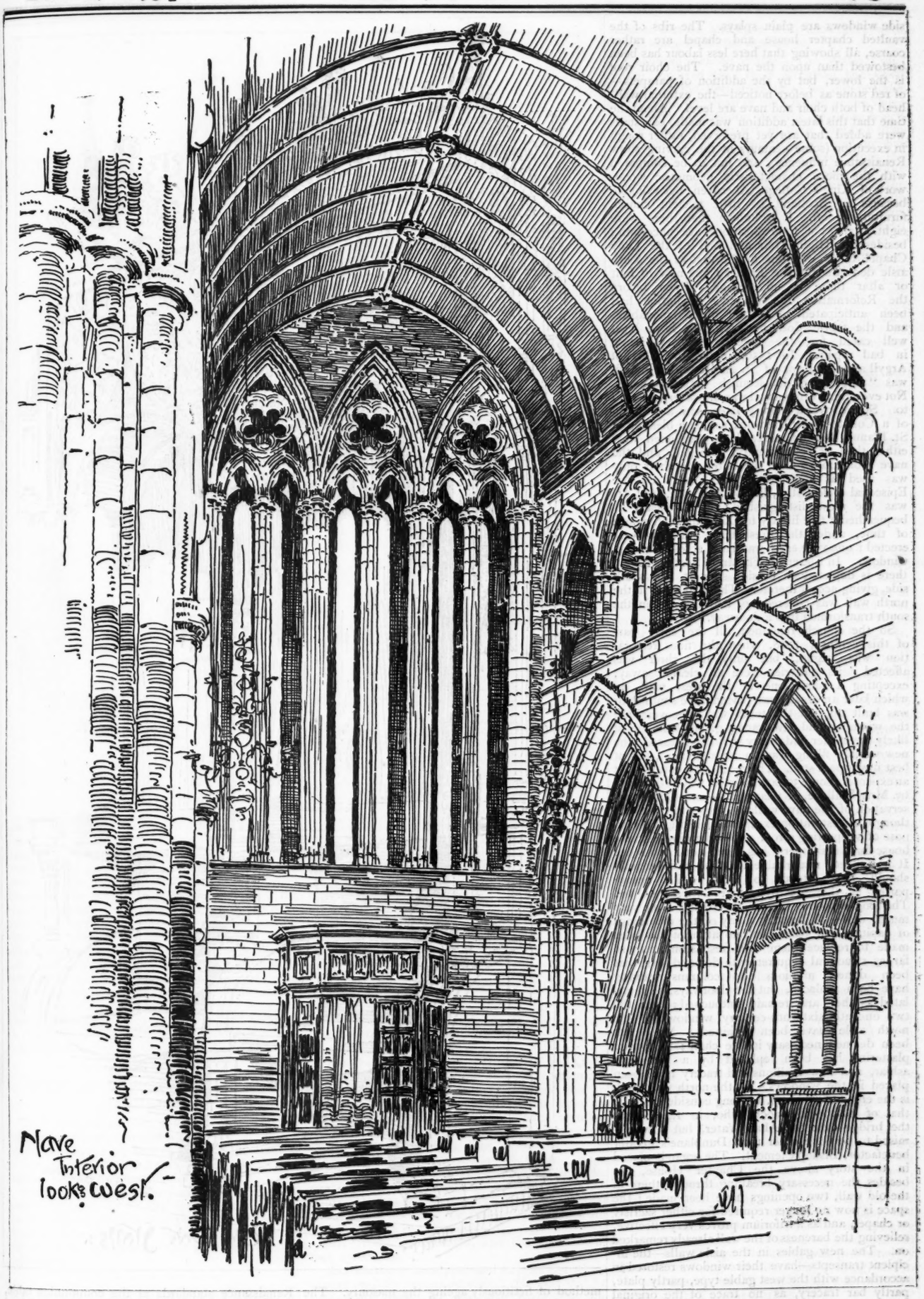
When the nave was completed, the old church —of which only a few fragments of a Norman arch are preserved—gave way for the new choir, whose ruder workmanship is evidence that whether or not the development had from the first been contemplated, when it came to be executed the money was scarcer than it had been, for everything is plainer than in the nave. The nave has north and south aisles, but these are not vaulted, so there is no triforium; the clearstory is a very graceful traceried double arcade, a passage way between, with two double lights to each bay. There is a north and two south doors; the finer of these, the eastmost, at one time possessed a porch, now quite destroyed. At the south gables of both aisles are traces internally of arches now filled up, solid on the north aisle, with a window in the south; not unlikely at first these were openings to the earlier church.

The west gable is both graceful and dignified; there are no windows in it to the aisles, interest being concentrated within the wide buttresses. The doorway is a single opening, widely splayed, of five orders of mouldings. In the arch these rather lose distinctiveness through want of any enrichment, and present rather too much the appearance of a mere reeded plane. On either side of the door are shallow arched recesses, with cusped heads; above is the well-known window of three double lancets, rising to an equal height, cusped circles forming the simple tracery; internally the effect is finer, for there is a double arcade, the inner one unglazed. In the apex of the gable is a vesica window, noticed by Mr. Ruskin in his "Edinburgh Lectures." The aisle windows are simple but effective; four lights within an arch, almost semi-circular. There has been some dislocation at the north-west corner, where are two ugly windows of three lights under an almost flat arch; these it is thought may be the outcome of Reformation violence, but it is not certain; the clumsy restoration appears to date about 1588, and not improbably was the work of the Crown authorities, for at that time it is known the king was petitioned by the Kirk to help in preventing Dunblane falling to ruin. Above the clearstory windows of the nave north wall, the ashlar facing has been stripped off, apparently for local building purposes, and the rough rubble is exposed.

There are no transepts in this Cathedral; the only sign of where their presence might be expected is given by the small gables rising from the aisle walls, but not to a height that interrupts the sill of clearstory windows. The choir is built of the same width as the nave centre aisle,

* The series of illustrations of the "Ancient Cathedrals of Scotland," which was begun in our issue of July 1 last, will be continued in the first number of each month, until March, 1894. Particulars of this, and of the series of "Cathedrals of England and Wales," which ended in June last, will be found on page 424. A short series of the "Ancient Cathedrals of Ireland" will follow the Scottish series.

New Oak Pulpit
panels inlaid



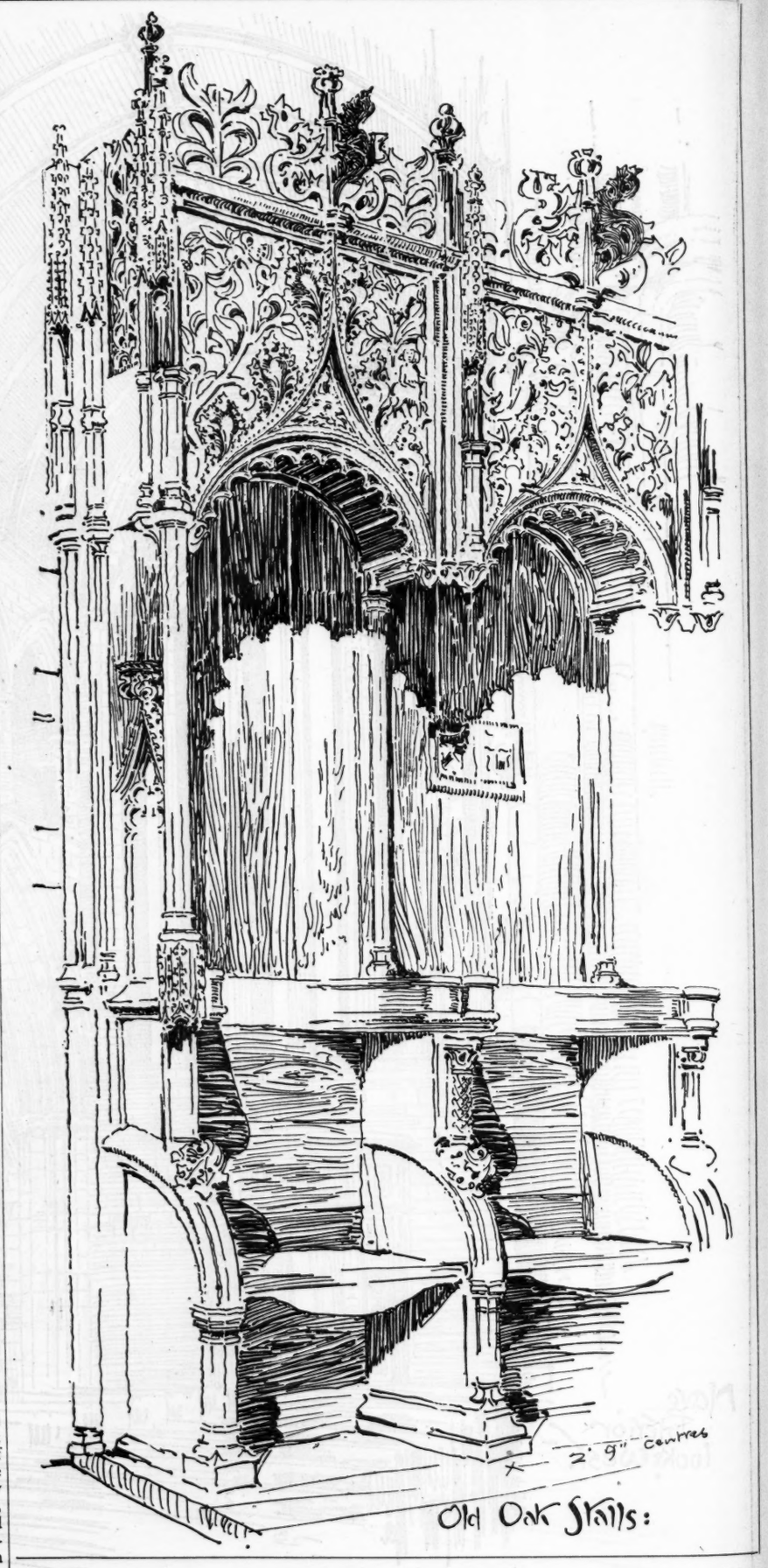

and its floor is on the same level. It has no aisles; in the south wall are six tall four-light windows, but one only north of the altar, otherwise that wall originally possessed only a clearstory and a door. This door gives entrance to a long vaulted apartment that occupies the position customarily given to a choir aisle; it is variously called Chapter House and Lady Chapel. There is no division, but not improbably the two eastmost bays were screened off and did form such a chapel.

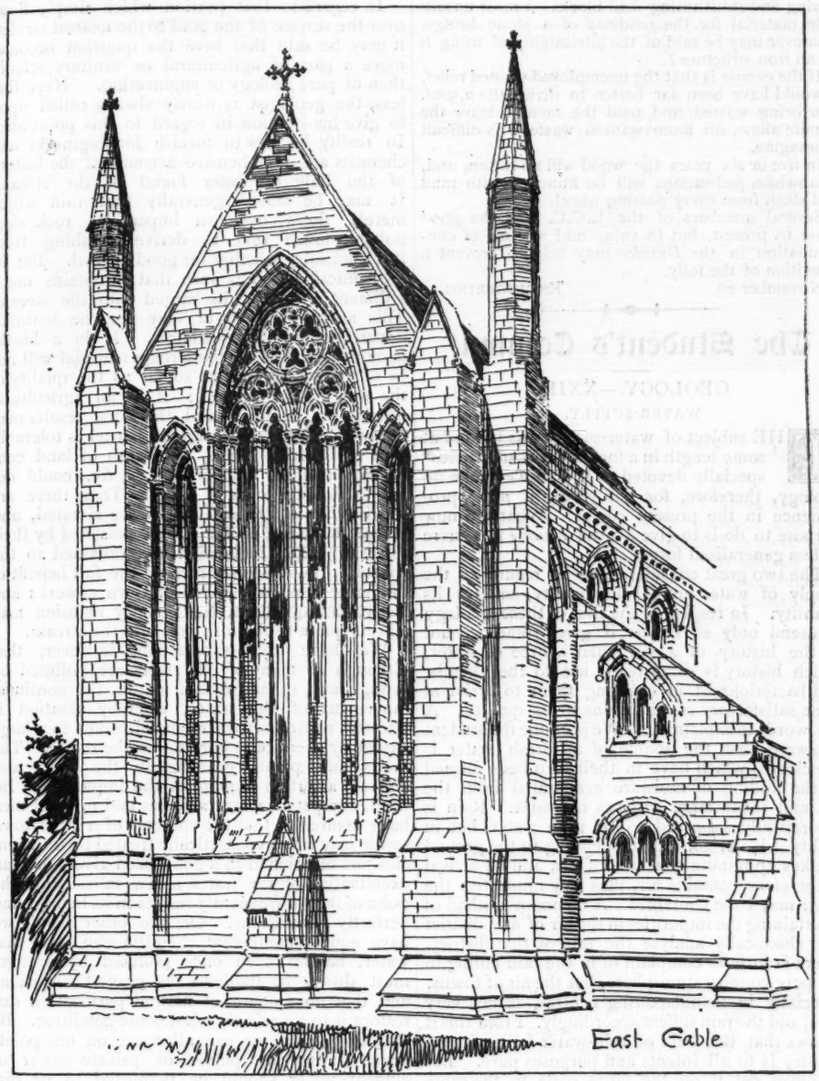
The "Chapter House" did not extend quite west to the nave, a small passage and corner stair to the apartments overhead intercepting; these apartments were probably a sacristy and another small chapel. The Chancel arch is but low, and permits of the wall above being pierced with a double opening; between its columns is the clear-story passage connected at a few steps higher level. This cross passage and the presence of certain sockets cut in the gable in its nave side that appear suited for supports to a small gallery, have had a purpose attributed to them—the exhibiting of relics to the congregation. The original tracery and mullions of the choir side windows have gone, and this is also true of the great east window. The inside jambs of the

side windows are plain splays. The ribs of the vaulted chapter house and chapel are rather coarse, all showing that here less labour has been bestowed than upon the nave. The choir roof is the lower, but by the addition of parapets—of red stone as before noticed—the external wall-head of both choir and nave are level. About the time that this latest addition was made, oak stalls were added that are yet preserved, rather rough in execution (some centaurs in the carving show Renaissance influence), and not to be compared with the more characteristic geometric woodwork of King's College, Aberdeen, but valuable because in Scotland so little ancient church furniture is left. It is known that there were eight altars, but their positions are uncertain; besides the High Altar and that of the Lady Chapel there was one in the east of the south aisle dedicated to the Trinity; but now of font or altar there is no vestige. Even before the Reformation the church's spoliation had been anticipated in respect of the movables, and the fabric does not seem to have been well cared for, the nave particularly being in bad repair. In 1559, under the Earl of Argyll and the Prior of St. Andrews, the church was "purged" of its Romish embellishments. Not everything ornamental was, however, objected to. Slezer, over a century later, saw a painting of a Countess of Strathearn asking a blessing of St. Blanus; but the north aisle, as mentioned, was, either then or subsequently, damaged, and the nave roof too, so that thereafter the choir only was used as a Protestant cathedral. Of the Episcopal ecclesiastics, Bishop Leighton, 1661-71, was the most distinguished; at his death he bequeathed a fine library to Dunblane. In course of time, under the Presbytery, galleries were erected; one very early was built across the east window. In Slezer's "Theatrum Scotiæ, 1692," there is depicted an outside stair at the south side, giving access thereto. The wall tomb in the north wall was covered up, and the one in the south transformed into a doorway.

So the church remained till the early part of this century, 1818, when the first restoration was begun, but only the choir was affected; its galleries were all cleared away, excepting a small one at the west wall, in which later an organ was placed; the south door was built up, but the tomb was irrecoverable; the windows had new tracery given them—most likely the earlier had pretty well disappeared; the new window filling was an improvement, but at best it was poor stuff. The recent restoration*—at an expense of some 30,000*l.*, almost wholly defrayed by Mrs. Wallace, of Glasingall—as a simple preservation of the nave walls as they were, without thought of restoration except to their original purpose of supporting a roof and so forming again a house for worshippers, has come none too soon. It is, indeed, remarkable that the nave arcades should have stood so long, quite unsupported as they are by either buttress or tie. The long exposure has weathered the stone very much, quite obliterating many of the mouldings of capitals and bases, but no attempt has been made to replace them with fresh stone, only so far as structural requirements demand has that been done; mullions and columns wanting have been replaced, but the doorways, all mutilated as they are, remain untouched; even the two uncouth sixteenth-century windows of the north aisle have been retained. More has been deemed necessary in the choir; its former plastering has been replaced by a facing of ashlar, and new mullions and tracery have been placed in the windows. In the north wall tomb is the effigy of a bishop, for long considered to be that of Bishop Dermoch, who, in 1419, built the bridge over the Allan Water, but now surmised to be none other than Dunblane's greater benefactor, Bishop Clement. The organ is placed in the story above the Chapter House, but besides the necessary breaking through there of the old wall, two openings have been made; the space is now no longer required for either sacristy or chapel, and as a triforium proves very effective, relieving the bareness of the wall already remarked on. The new gables in the aisle walls—the incipient transepts—have their windows restored in accordance with the west gable type, partly plate, partly bar tracery, as no trace of the original model remains. The roofs are covered with green slates, of pleasant colour in one or two variations of shade, but the texture is unpleasantly smooth and regular. The new stone used has been taken from three or four quarries, so the appearance of raw newness is avoided without recourse to any method of fictitiously ageing the masonry. The exposed woodwork of the roofs is of darkened oak—structurally, steel has been largely employed in the principals—and points of colour are introduced in the emblazoned shields on corbels and bosses of the historical patrons of the see. The new screen, pulpit, and organ-case are also of oak; in style they show a blending of Renaissance and Gothic forms. There are pendant gas coronas in the nave, wall sconces in the choir, with two large Renaissance standards at the communion table, and a lectern, all of brass. Besides the sculptured figure in the choir tomb there is another, of Bishop Michael Ochiltree, 1429, in the nave, south aisle; the recess has a straight-sided arch top, and the figure would seem to have been cut to suit its size. There is also a double effigy of a Lord Strathearn and his lady, 1271, cut from the one block of stone. In the choir floor are three rough slabs that may once have had brasses

* The architect of the restoration is Dr. Rowand Anderson.






affixed, commemorating Margaret, wife of James IV., Euphemia and Sybilla, three daughters of Lord John Drummond, all treacherously poisoned at a breakfast in 1501 to permit of the king's matrimonial alliance with England. In the north aisle are preserved the various fragments found; and a Celtic cross has been built into the floor upright. In Walcott's book is shown the situation of the various houses of the church dignitaries; several were extant in Slezer's time, but only traces and fragments now remain. Besides the books already noted having reference to Dunblane, there is Grose's "Antiquities" (Scotland), whose drawings were made in 1790, Bishop Pococke's "Letters," 1760, and Billings. In the "Scots' Magazine" for November of this year is a notice by Dr. Cooper, of Aberdeen.

## VIEW IN NAVE OF DUNBLANE CATHEDRAL.

THIS view, taken from a water-colour drawing made a good many years ago by Mr. R. Phené Spiers, shows the western portion of the interior of the nave of Dunblane Cathedral as it stood roofless before the recent restoration.

While entirely approving of the steps which have been taken to fit this long-deserted church for its original purpose as a place of worship, we thought it would be of interest to give also a record of its appearance and state previous to restoration.

## WINDOWS FOR ORLÉANS CATHEDRAL.

THE designs for stained glass windows for the Cathedral of Orléans are selected from among the set, designed by M. Galland and M. Gibelin, which have been selected in the competition recently mentioned in our columns.

The following subjects for ten windows were given to the competitors: (1) Domrémy; Joan listening to the voices: (2) Vaucouleurs; Joan on horseback setting out to interview Charles VII.: (3) Chinon; Joan presented to the king: (4) Orléans; Joan entering the Bourgogne gate: (5) Orléans; Joan at the assault of the fortress of Tourelles: (6) Joan giving thanks in the Cathedral: (7) Joan at the coronation at Rheims: (8) Compiègne—Joan taken prisoner: (9) Rouen; Joan prisoner in the tower of the château; (10) Rouen; execution of Joan. The windows illustrated are those representing subjects 5, 7, and 8.

## THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday at the County Hall, Spring Gardens, Mr. John Hutton, Chairman, presiding.

*The Question of Wages.*—The Parks and Open Spaces Committee reported that their attention having been called to the fact that there were in the employ of the Council six men who acted as lavatory attendants at parks, &c., and a caretaker who received 18s. a week each, and another caretaker at 20s. a week, they recommended:—"That all men employed at parks and open spaces, other than those engaged by the hour, be paid 4s. a day."

Mr. Doake proposed as an amendment that the words "not less" be inserted after the word "paid" in the recommendation.

Mr. Grosvenor seconded, and the amendment was agreed to.

Mr. Torrance then proposed to refer the whole matter back for reconsideration. He said that he had every desire to pay men fairly, but the Council, in whatever it did, should remember the ratepayer. The men in their employ to whom they paid less than 4s. per day were men whom the Council had taken on out of compassion, and they were in no sense able-bodied. The only effect of the resolution if passed would be to result in the dismissal of the men.

Mr. LEMON seconded the amendment.

Upon a show of hands the amendment was declared carried, and upon a division there were for the amendment 62, against 30.

*Analysing London Water.*—The Water Committee reported that their attention had been directed to the desirableness of an independent examination on behalf of the Council of the water supplied by the London Water Companies which derive the whole or part of their supplies from the Thames or Lea. They were of opinion that samples might be taken twice a week from the mains of the different Companies and from the rivers in the vicinity of the intakes, omitting the Kent Company, which derived its supply entirely from wells in the chalk. That would give sixteen samples in all, and the expense would not exceed ten shillings a sample. They recommended:

"That, subject to an estimate to be submitted to the Council by the Finance Committee as required by the Statute, the chemist be instructed to take sixteen samples weekly of the water supplied by the London Water Companies, other than the Kent Company, at varying points, fourteen of such samples to be taken from the mains and two from the vicinity of the intakes, and that he do submit the results of analyses of such samples to us."

Mr. Lean opposed the motion and moved that it be referred back, as it would be a useless expenditure of money.

Mr. Westacott seconded, and ultimately the amendment was carried.

After transacting other business the Council adjourned at half-past seven.

## BUILDERS' BENEVOLENT INSTITUTION:

### ANNUAL DINNER.

THE forty-sixth annual dinner in aid of the funds of this Institution, was held on Thursday, November 23, at Carpenters' Hall, London Wall. Mr. G. E. O. Howard Trollope, the President of the Institution, occupied the chair, and was supported by Mr. J. E. Trollope, Mr. T. F. Rider, Mr. E. B. I'Anson, Mr. G. Burt, Mr. Young, Mr. Bartlett, Mr. Preston (Clerk of the Carpenters' Company), Mr. Randall, Mr. Higgs, Mr. Hall, Mr. T. Stirling, Mr. C. Bussell, and Mr. T. J. Bolding.

The Chairman gave the toast of "Her Majesty the Queen, the Prince and Princess of Wales, and the rest of the Royal Family." The Chairman also gave "The Army, Navy, and Auxiliary Forces," Major Brutton responding for the Army and Navy and Captain Roe for the Auxiliary Forces.

The Chairman, in proposing the toast of the evening, "Success to the Builders' Benevolent Institution," said that the objects of the charity were stated in the annual report, which was sent to every subscriber, and were the granting of pensions to necessitous members of the various branches of the building trades and their widows. Some people might say that they did not see the need for an institution of the sort, but a charity with such a splendid record had no fear of criticism. It had been in existence since 1847, and had since then enabled over 250 persons to spend their later years in comparative comfort, which otherwise would not have been the case. The need for such an institution was emphasised by the fact that the building trade had perhaps more vicissitudes than any other business. In one case a risk might turn out favourably, while in another it might turn out quite the reverse, and the builder might be reckoned by the superficial observer as a fortunate or a stupid man. Unfortunately, from one cause and another, the funds were not in so flourishing a condition as they should like to see them. A great many of the old friends of the Institution had died, while others had not been able to subscribe, for during the last twelve months trade, as they all knew, had been very bad. Altogether they had a good deal to contend with, but he had been able to secure forty-two new subscribers. They had fifty pensioners on the funds, and hoped to be able to add two or three. He was sorry that their old friend, Mr. George Plucknett, was prevented by illness from being with them that evening, and in his absence he would couple the toast with the name of Mr. Thomas Stirling.

Mr. T. Stirling, in replying on behalf of the Institution, expressed the great interest he had always taken in its beneficent operations.

Mr. H. H. Bartlett gave the "Worshipful Company of Carpenters," to whom they were indebted for the use of the hall in which they met, and for substantial donations to the funds of the charity.

Mr. S. W. Preston (clerk of the Company),

replied. The Company, he said, was a very poor one until within the last twelve or fifteen years, but by the wise development of their estate they had not only been able to increase the revenues considerably, but to further the cause of technical education. In conjunction with other City Companies they had lately taken large premises in Great Titchfield-street for holding classes confined to those employed in the building trade, and it would be well if masters would make these known to their employés.

Mr. T. F. Rider proposed "The Chairman and President." The toast was received with acclamation, and the Chairman replied.

The Chairman then proposed "The Architects and Surveyors," without whom, he said, the builder could do very little.

Mr. W. Young, the architect of the Glasgow Municipal Buildings, in responding, spoke of the cordial feeling which should always prevail between the architect and the builder. A great deal had been said in recent days about bad building, and as to their not being up to the æsthetic mark. He maintained, however, that there had never been a time in the history of this country when architects were so much in earnest as at present. In spite of what was said about bad building, if clients would only pay the price they could get as good work, if not better, than had ever been done before.

Mr. H. Northcroft replied for the Surveyors.

The remaining toast was that of "The Vice-Presidents, Committee, and Stewards."

In the course of the evening subscriptions and donations to the amount of 909*l.* were announced, of which 616*l.* appeared in the President's list.

## Correspondence.

*To the Editor of* THE BUILDER.

### TULLIE HOUSE, CARLISLE.

SIR,—Had your correspondent Mr. Fred. M. Simpson, who was, I believe, formerly an assistant with Mr. C. J. Ferguson, availed himself of the opportunity thus afforded and obtained from his late principal correct information before writing to you, he would have ascertained that the *Times* and other papers were quite correct in stating that the "plans and drawings for the alterations and additions to Tullie House, Carlisle, and the converting of it into a Free Library and School of Art, were prepared by the City Surveyor, Mr. W. Howard-Smith," who was, I would say, appointed by the Corporation of Carlisle in November, 1890, the architect to carry out such works, and whose services in that capacity were recently acknowledged by the Mayor of Carlisle, when proclaiming the buildings open, in the following words:—"I must compliment Mr. Howard-Smith, the Surveyor of Carlisle, for the noble monument which he has erected here to his ability as an architect."

No doubt had Mr. Ferguson had any reason for thinking the *Times* and other papers had in any way mis-stated the facts, he would himself have taken measures to point out any mistake, and not have left such a task to Mr. Simpson.

W. HOWARD-SMITH, City Surveyor.

*City Surveyor's Office, Carlisle.*

### NORWICH CATHEDRAL.

SIR,—Your note in last week's *Builder* with reference to Norwich Cathedral is well timed. The Dean and Chapter after obtaining, some time ago, a report from Mr. Pearson, R.A., have apparently dispensed with his services in supervising the works now going on, and have entrusted them to a young local architect. The chief work seems to be a wholesale chipping off of whitewash with which the whole structure has been long ago most liberally treated, the result being that any appearance of age which may have been present is fast disappearing, and we are making the acquaintance of an apparently brand-new Norman interior.

One has only to refer to Britton to see what mischief has been done in times past in the attempt to get the cathedral up as a perfect Norman Benedictine church. Perpendicular tracery has been removed, and pinnacles have been Normanised, and it is high time indeed that the responsible authorities should disavow such things. Some of the cylindrical features at the angles of the great tower are in cement! The roof is said to be in a bad state, and when these structural defects are remedied there is ample to engage the attention of the Dean and Chapter in providing some adequate amount of dignity to the surroundings of the altar, which at present would hardly do credit to a mediocre parish church.

NORVIC.

### THE L.C.C. AND WATERLOO BRIDGE.

SIR,—Will you allow me to protest against the folly and extravagance of the Engineering *(sic)* Department in taking up sound and durable granite paving and substituting deal blocks—a most unsuitable material for the roadway of a stone bridge, whatever may be said of the advisability of using it on an iron structure?

If the excuse is that the unemployed wanted relief, it would have been far better to divide the 2,500*l.* now being wasted, and paid the men to leave the granite alone, for more wanton waste it is difficult to imagine.

In five or six years the wood will be rotten, and, meanwhile, pedestrians will be annoyed with mud and slush from every passing wheel.

Several members of the L.C.C. had the good sense to protest, but in vain, and a word of condemnation in the *Builder* may help to prevent a repetition of the folly.

November 29. ENGINEERING.

## The Student's Column.

### GEOLOGY.—XXIII.

#### WATER-SUPPLY.

THE subject of water-supply was treated at some length in a former series of articles* specially devoted to it, and we make no apology, therefore, for not giving it more prominence in the present course. What we now purpose to do is to give a brief *résumé* in a more or less generalised form.

The two great considerations in regard to the supply of water are (1) its quality, and (2) its quantity. In respect of the first of these, geology is useful only so far as it gives some account of the history of a particular source of water, which history is of material use to the chemist and bacteriologist in enabling them to arrive at some satisfactory conclusion as to its quality. A few words to explain this. We presume the student is aware that the source of all fresh water is the clouds, which have in their turn been formed by the chilling of moisture evaporated from the sea and other large surfaces of water. Rain is theoretically supposed to be pure water, but in reality it is not so. In descending to the ground it takes up minute particles of air, and on arrival it therefore contains air, plus any impurities the latter may have contained. A common method of ascertaining the impurities in the air of any district is to chemically analyse the rain of that district. There is little to complain of in the rain falling in the pure country atmosphere, but the air of towns, especially in manufacturing centres, is not very pure, and the rain suffers accordingly. From this it follows that the bulk of rain-water falling in the country is to all intents and purposes pure. But we never get it on the large scale in the same state as it has fallen. On arrival at the surface of the ground, a part of it sinks in where the soil is absorbent, another part flows away into the nearest rivulet or stream, and a third part is evaporated and returns to the atmosphere. The precise proportions of rain involved in these three operations entirely depend on local circumstances. If the soil is very porous, a large amount rapidly finds its way underground; on the other hand, if the earth is argillaceous, and practically impervious, rivers and streams directly derive a relatively greater quantity. As we are dealing now merely with the question of quality, we need only trace the history of the rain after its arrival, leaving quantity for future discussion.

That portion which sinks into the ground will either be found in superficial beds, or in the solid rock, but in any case the greater part of it, after undergoing a tedious underground journey, will come to the surface again as springs. We have now to ascertain whether its peregrinations have done it any harm. Knowing the geological structure of the district wherein the whole of the operations have been conducted—from the descent of the water as rain, to its emergence as springs—the geologist can frequently furnish an accurate account on this head. If the chief water-bearing bed of that district is calcareous, he will be able to state that during its wanderings the water has taken up a considerable quantity of lime, which will account for its having become what is technically called "hard"; if the beds contain much salt, the water will be brackish; if they are ferruginous, iron will be present; if derived from a superficial bed of peat, the water will be discoloured, and full of finely-divided vegetable matter. It may be said that the chemist could ascertain the presence of lime, iron, salt, &c., in the water without the aid of the geologist, which is perfectly true; but it is important to the water analyst not only to know what the water contains chemically, but how the ingredients got into it. He has then a better opportunity of judging its quality.

In regard to that portion which simply flows over the surface of the land to the nearest rivulet, it may be said that here the question becomes more a part of agricultural or sanitary science than of pure geology or engineering. Nevertheless, the geologist is nearly always called upon to give his opinion in regard to this point also. In reality he has to furnish for engineers and chemists a comprehensive account of the history of the bulk of water found in the stream. It may be stated generally that rain which merely flows over an impervious rock does not get much time to derive anything from it chemically, whether for good or evil. But its mechanical action is such that it obtains much sediment which is discharged into the stream. This sediment may, or may not, be harmful, depending on circumstances. If in a bleak, uncultivated district, the foreign material will not be of much consequence so far as the quality of the water is concerned; if in an agricultural district, on the other hand, the worst results may follow, for deleterious organic matter is tolerably sure to be introduced. The wash of land containing manure, farmyard refuse, &c., could not fail to produce such a result. Then there are districts in which lead works are situated, and where the water is liable to be poisoned by their refuse. Unless legislation has ordained to the contrary, the river may receive the full benefit of discharge from a number of town sewers; and lastly, but not least, the country mansion may add its quota to the filth sent into the stream.

We have this satisfaction, however, that although so many of our rivers are polluted by sewage and other organic matter, the continual movement of the water, whereby aëration is effected, neutralises their baneful results to a large extent by chemically burning up the refuse. The fishes and plants growing in the water also abstract a certain amount of the impurities. Indeed, competent water analysts and medical men have assured us that the contents of a large town sewer may be so energetically treated by the agencies just mentioned in a good-sized river, that an examination of the water a few miles below the point of outfall frequently results in its being found perfectly wholesome. On the other hand, we have equally competent chemists who state that water, having been once polluted by sewage, must always be liable to the gravest suspicion, and that no amount of natural purification can restore it to a perfectly wholesome condition. Be that as it may, we can all agree on one point, namely, that no public or private sewer or effluent water should be permitted to be discharged into any stream, tributary, or river drawn upon for the purposes of water supply. So much for drinking water obtained at the surface of the ground.

Let us now consider the quality of water derived from wells. The latter may be divided into two groups, (1) shallow wells and (2) deep wells. The former class may be illustrated by fig. 1. Here we have a well (*x*) sunk into a bed of gravel and sand (*a*) containing a large body of water held up by impervious clay (*b*). The well may not be more than 12 to 15 ft. in depth. Being so easily constructed, this type has been almost universal, until recent years; but the water it yields is, in the vast majority of cases, fearfully polluted. Such wells are, in general, dug for convenience sake, close to the country dwelling, or in the farmyard, and they have thus become intimately related with the neighbouring cesspools dug also in the same porous stratum of gravel and sand. The result can be better imagined than described.

There is no need, however, to go to the country to furnish examples of the bad effects of shallow wells; they may be culled much nearer home. As an instance, we may quote the circumstances connected with the closing of the well-known "holy well" from which Holywell-street, Strand, took its name. In London, during the cholera epidemic of 1866, the Privy Council gave certain medical men instructions to close the wells in their respective areas, and many were found in the Strand. There was a great struggle, however, between the public and the authorities with reference to the "holy well" referred to, and the inhabitants continued to pump from it until the pipes were taken up. After the latter had been removed, Dr. J. Groves states* that he descended into and examined this well, and actually found a drain emptying into it, which drain, it was subsequently discovered, was in direct communication with a place where cholera stools were thrown. People sent from far and near for water from this "celebrated" well.

* The *Builder*, Vol. LVII. (1889), July-Dec.

* "*Trans. Sanitary Inst.*," Vol. XIII. (1892), p. 269.

FIG. 1

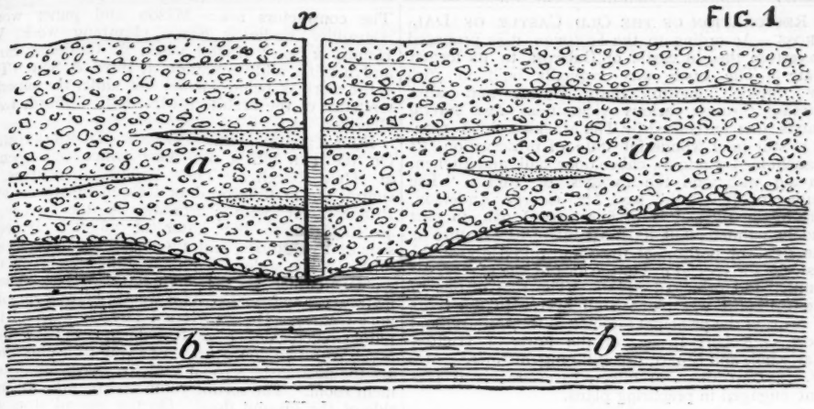



*Fig* 1.—*Shallow Surface Well.*

*a*—Water-bearing sands and gravels lying on *b*—A bed of clay, impervious to water.
*x*—Well dug through *a* to surface of *b*.

The case with reference to deep wells, however, is entirely different. When properly constructed, the water yielded by them is very rarely contaminated, unless the source of the water itself is bad. Fig. 2 will serve to illustrate a deep well

FIG. 2.

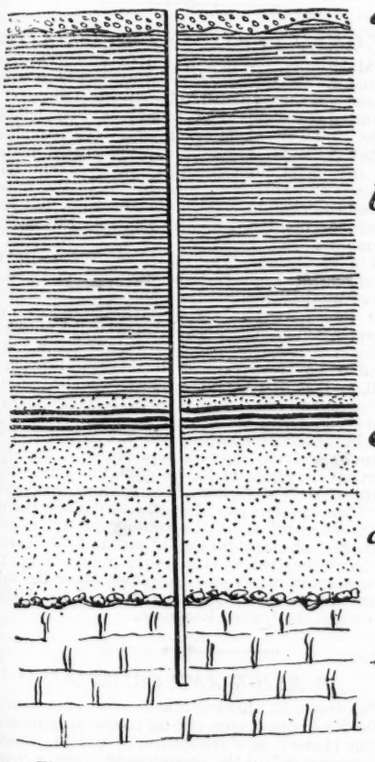



*Fig.* 2.—*Deep Well—London District.*

*a*—Drift gravel, &c. *b*—London Clay. *c*—Woolwich and Reading Series. *d*—Thanet Sands. *e*—Chalk.

sunk in the London district. Here the actual well may only extend downwards partly into the London Clay, the remainder to and into the Chalk being merely bored. Or, the whole well may be carried down into the Chalk. In any case, the contaminated water in the superficial drift deposits is effectually kept out of the well by that portion of it being lined with an iron cylinder prolonged into the London Clay, which is impervious and arrests the downward progress of the impure water. The London Clay itself (from 50 ft. to 250 ft. in thickness, depending on the district in London) is usually devoid of water, but sandy deposits therein have been known to yield a considerable quantity. Assuming the well is made into the Chalk, the London Clay portion is usually merely lined with bricks set in cement, or similarly constructed. On arrival at the pebble and sandy beds at the base of that formation, however, and especially on penetrating the Woolwich and Reading series and Thanet Sands, much water is met with, generally of inferior quality. This is promptly stopped out by lining that portion of the well with iron cylinders of reduced diameter—similar to those used on passing through the drift above. The Chalk is the best water-bearing stratum in the London district, and the well is carried some distance into it. Such a well, if properly constructed to keep out the contaminated water in the drift and in the loose deposits under the London Clay, should yield nothing but pure Chalk water, rather hard —nevertheless of unquestionable purity.

It may be inquired how the water in beds *c* and *d* became contaminated. The answer is simple enough. They used to be the beds from which several private establishments obtained water some years ago. The majority of wells sunk into them, however, were one after the other abandoned, and some were then filled with rubbish, which naturally did not improve the quality of the water. Many let in impurities from above and at the sides, and the sources of contamination increasing, the general body of water in the two formations became, to say the least of it, to be strongly suspected in certain areas. Moreover, the Woolwich and Reading series contains beds of lignite here and there. In some districts under London, however, the water in the Woolwich and Reading and Thanet beds is yet of good quality.

We have not space to multiply examples of this kind, but it may be taken generally that where a deep-seated water-bearing stratum is known to contain good potable water, it seldom or never deteriorates in quality, except by faulty well-construction. Water from deep-seated sources is, as a rule, very pure, having undergone such an efficient filtration in its descent from the surface.

## *OBITUARY.*

MR. W. H. ELLIS.—On the 25th inst. the death took place of Mr. William Henry Ellis, J.P., D.L., which occurred at his residence at Anstey Grange, Leicester. For some time in early life the deceased resided at Beaumont Leys, and afterwards at Newfoundpool. Taking early to commercial pursuits, he became a member of the firm of John Ellis & Sons, cement merchants, and for some years past was head of the firm. He was also senior partner of Ellis, Partridge, & Co., and chairman of the Knighton Junction Brick Company.

"THE GRECIAN HOUSE."—The concluding words of Professor Kerr's speech at the last Institute meeting (page 391 *ante*) were incorrectly given in our report; the sentence should have run "this plan of the Roman and Greek house was very instructive. The same idea was still carried out by the Spaniards, French, and Italians, to the present day, whereas all the Teutonic nations disused the court entirely as a place of abode, and substituted a covered hall." Professor Kerr had a proof of his speech, but for some reason it was returned too late for correction.

METHODIST CHURCH, BELFAST.—A Methodist church, situated in Duncairn-gardens, Belfast, was dedicated a short time since by the Rev. J. Ernest Clapham, London. The portico of the building is built of stone, the arcaded entrances having clustered columns and deeply recessed mouldings. These entrances lead to a vestibule, with sliding and swing doors, which communicate with the inner porches. The interior dimensions of the church are 65 ft. long by 50 ft. wide by 36 ft. high in the centre. It is capable of accommodating 800 persons. The ventilation is effected by natural and automatic means, and the heating by Musgrave's small-bore tubes. The building contract has been executed by Mr. James Kidd, from the plans, and under the superintendence, of Mr. J. J. Phillips, architect. The total cost of the church and schools is about 5,000*l*.

## *GENERAL BUILDING NEWS.*

PROPOSED HOSPITAL, WIMBLEDON.—On the 10th ult., Dr. R. Deane Sweeting, one of the Medical Inspectors of the Local Government Board, held an inquiry at the Local Board Offices, Wimbledon, respecting the application of the Local Authority for sanction to borrow 7,000*l*. for the erection of an isolation hospital, the plans for which have been prepared by the Engineer and Surveyor to the Board, Mr. C. H. Cooper, A.M.Inst.C.E. It is proposed to erect the hospital on an enlargement of the site of the building now used as an isolation hospital, and known as "Durnsford Lodge." The buildings proposed are as follows:—(1) Two pavilions containing twelve beds each; (2) one pavilion containing ten beds; (3) administrative block. The pavilions for patients are intended to be enclosed with 14-in. brick walls, carried on concrete arches, and covered with slate roofs. Verandahs are placed alongside each pavilion, under the shelter of which convalescents can take air, and, if desired, provision is made for patients in bed to be wheeled from wards under these verandahs, a system which has met with marked success in Berlin. The wards are in pairs for male and female patients, separated by a nurse's duty room, in which there are fixed windows for overlooking each ward. The wards are lighted by windows on opposite sides, arranged so as to act as ventilators. Each ward can be heated by a stove, and has a water-closet, and in the case of the large wards, a slop-sink attached, which, so far as ventilation is concerned, is cut off by a vestibule. In each of the two pavilions containing the larger wards, a bath-room is placed, which acts also as a discharging room, the patients entering by an internal door and leaving by one opening direct into the outer air. Each nurse's duty-room is fitted with a stove, slop-sink, &c. The minimum cubic space allowed per bed is 2,028 cubic ft., and the minimum floor area per bed is 156 ft. sup. The pavilion containing small wards, *i.e.*, two three-bed and two two-bed wards, with two nurses' duty-rooms, is intended for the reception of doubtful cases, patients requiring a private room, and those attacked with diseases of more or less rare occurrence. The administrative block is designed to accommodate eight nurses, nine servants, and one matron. The ground floor contains waiting-room, medical officer's room, servants' mess-room, nurses' sitting-room, matron's sitting-room, pantry and kitchen, with stores, larder, and detached water-closet. The first floor contains matron's sleeping-room, four nurses' sleeping-rooms, one leading servants' ditto, dormitory for four servants, with linen store, two bath-rooms, and two water-closets. The second floor contains three rooms for four night nurses, and dormitory for four servants.

TECHNICAL SCHOOL, BIRMINGHAM.—On the 18th ult., the Right Hon. A. H. D. Acland, M.P., laid the foundation stone of the new Municipal Technical School, Birmingham. The chief frontage of the building will be in Suffolk-street. The architects of the building are Messrs. Essex, Nicol & Goodman, who were selected in competition, and the tender of Messrs. Sapcote & Sons was accepted for the work at a cost of 47,489*l*. The sub-basement is placed at a level of 25 ft. below the pavement in Suffolk-street, and will contain the engine-rooms (60 ft. by 30 ft.), in which will be placed the gas-engines to drive the ventilating fans and the necessary engines for generating electricity for lighting and motive power; also the foundry and stamping shop (about 45 ft. by 38 ft.). The remainder of the sub-basement is arranged to contain the heating apparatus. On the basement floor the principal departments surround an internal area 100 ft. by 47 ft. for light and ventilation. The iron and steel shop, which is first entered on emerging from the engine-rooms, will be an apartment 60 ft. by 46 ft. Adjoining it will be the iron and steel stores, and in a detached building in the court-yard is a pattern-maker's room. Passing into the west staircase, which adjoins in the main corridor, is the lecture room in connexion with the metallurgical department, the site of which is 45 ft. by 34 ft., next to which are the preparation rooms and stores. In the main corridor are the brass shops and metal-plate plumbing shops. The mechanical laboratory will contain the testing machines and other mechanical appliances, adjoining which is the practical lecture-room and preparation room. On the lower ground floor are the metallurgical laboratory and the balance room, and a room for metallurgical stores. The remainder of this floor on the front wing towards Suffolk-street is the laboratory for electro-metallurgy and bronzing, the practical lecture room, preparation room, battery room, and dynamo room, and on the east wing the carpenters' shop and a suite of rooms connected with the metallurgical department, consisting of two practical lecture rooms and the metallurgical museum. The ground-floor is entered from Suffolk-street by an entrance which communicates with the west staircase, and is also connected with the east staircase by a corridor 9 ft. wide, which is repeated on every floor of the building. The principal room on this floor is the assembly hall and examination room. In the front wing on this floor is placed the suite of administrative offices, consisting of secretary's office, clerks' room, principal's room, and committee room, and in the back wing two large lecture rooms, students' common

room, teachers' room, and room for the principal of the metallurgical department. Adjoining the entrance is the curator's office, which communicates with his residence. The first floor contains rooms devoted to physics and chemistry. The suite of rooms for applied physics is placed in the back wing, and includes a lecture room for electrical engineering and telegraphy, laboratory, battery room, dynamo room, photometry room, and workshop; also a private room for the principal in the chemistry and physics department. The second floor is devoted to class rooms for the women's department, and a large drawing class room for geometry, and a lecture room and museum for geology and botany, which covers an area of about 50 ft. by 45 ft. There are other rooms on this floor for the use of the teachers and retiring room for women. In a mezzanine, occupying a portion of the centre block, are the chemistry and sanitary science museums. The third floor is almost entirely devoted to chemistry. The mechanical drawing room is also placed in the south-east part of this floor. The structure is a brick and terra-cotta building. The terra-cotta selected is buff in colour. The building is Renaissance in style.

QUEEN'S HALL, LANGHAM PLACE.—This new concert hall, of which the plan and interior and exterior views, with a description, were published in the *Builder* for February 14, 1891, has just been completed. The contractor was Mr. Charles Wall of Chelsea, and special works were carried out by Messrs. Doulton, Quillet (of Paris), Campbell, Smith, & Co., and others. Messrs. Sidney W. Elmes & Son executed the exterior carving. The furnishing was done by Messrs. Lapworth Brothers & Harrison. The design was published in our pages as that of Mr. C. E. Knightley; we have received a letter claiming it for Mr. C. J. Phipps, and stating that the rival claims had been referred to the President of the Institute for his decision.

CATHOLIC CHURCH, COVENTRY.—On the 21st ult. the new Catholic Church, Raglan-street, Coventry, was opened. The church, which is dedicated to St. Mary, is in the Early English style, and consists of nave, chancel, Lady Chapel, baptistry, entrance porch, vestibule, and an organ gallery running the entire width of the church at the western end, and two sacristies situated between the church and presbytery. The buildings are of brick, with Bath stone dressings, and the roof is slated with ornamental red ridges. The chancel and nave inside have a barrel roof of pitch pine. The chancel is of apsidal form, and contains four stone arches, two on either side, with marble columns and carved stone capitals opening into the Lady Chapel and nuns chantry respectively. The nave floor is of oak blocked in the aisles with raised wooden platforms under the bench spaces. The side walls of the nave are of moulded stone arches forming recesses which receive the traceried stone windows filled with ornamental leaded lights of tinted glass in geometrical designs. The chancel floor and altar steps are of marble and encaustic tiles. The chancel is lighted by recessed, trefoil headed, couplet windows, supported on marble shafts with carved capitals. The large arch at the back of the altar is filled with a sculptured subject representing the crowning of the Blessed Virgin, which forms the principal part of the reredos, and this, together with the altar and tabernacle, has been executed by Mr. A. B. Wall, sculptor, of Cheltenham. The buildings, as well as the altar and reredos, are from the designs of Mr. T. Richmond Donnelly, architect, of Coventry. Mr. C. Gray Hill was the builder. The hot-water apparatus was supplied by Mr. Pearson, of Coventry.

SCHOOL-CHURCH, LEVENSHULME, LANCASHIRE.—On the 22nd ult. the new school-church erected in Barlow-lane, dedicated to St. Mark, and in connexion with the parish church of St. Peter, Levenshulme, was opened. The building is of brick, and for purposes of worship seats are provided for 300 worshippers. The building has been erected by Messrs. Bullivant & Son, Newton Heath, from plans by Mr. J. H. Maybury, architect.

PROPOSED ENLARGEMENT OF ST. AGNES'S CHURCH, BIRCH, LANCASHIRE.—At a special vestry meeting of the parishioners of St. Agnes's Church, Longsight, on the 24th ult., it was resolved that the plans of the addition of a new north aisle affording accommodation for 200 more worshippers, prepared and submitted by Mr. Medland Taylor, architect, Manchester, be approved. The proposed enlargement will involve an outlay of about 1,000*l.*

CHURCH, NEW TREDEGAR.—The Bishop of Llandaff consecrated, a short time since, the new church dedicated to St. Dingat at New Tredegar. The total cost of the new church is 2,250*l.*, and it will accommodate a congregation of 400. The building is Early Gothic in style and is built in local stone, with buff terra-cotta dressings, with roofs of red deal. Messrs. Seddon & Carter (Cardiff) were joint architects with Messrs. James & Morgan (Cardiff), the design being by Mr. Carter, and the erection superintended by Mr. Morgan. Messrs. Williams & Son, of Trefeinon, Talgarth, were the builders.

MODEL LODGING HOUSE, LEITH. — The memorial stone of a model lodging-house which the Corporation of Leith is having erected on the Improvement Scheme area was recently unveiled by Bailey Archibald. The architect of the building is Mr. James Simpson, and Mr. James Kinnear is the builder. The lodging-house is to cost about 4,000*l.*

RESTORATION OF THE OLD CASTLE OF DALCROSS.—According to the *Scotsman*, it is proposed to restore the old castle of Dalcross to its former state. The castle was originally built in 1620 by Simon, eighth Lord Lovat, and after passing through various vicissitudes and several hands, was purchased by The Mackintosh in 1702. It is still in a wonderful state of preservation, its stanchioned windows, oaken door, hall, and kitchen, having withstood the ravages of time. "The ceiling of the hall," says Mr. George Anderson, writing in 1863, "is of fine carved oak, in part rudely painted; but its most interesting feature is the daïs, or portion of the floor raised above the rest, for the special use of the lord of the manor, his family, and principal guests. The roof of one of the bedrooms was painted all over with the coats of arms of the principal families in the country, and those of Robert Bruce, of the Earls of Huntly, Marischal, and Stuart, are still quite distinct. Mr. W. L. Carruthers, architect, Inverness, is at present engaged in preparing plans.

CHURCH, ABBEYDALE, SHEFFIELD. — On the 16th ult. the Duchess of Portland laid the foundation stone of the new Church of St. Peter, Abbeydale. The church is designed to accommodate about 800 people. The ground falls rapidly from west to east, and advantage has been taken of this to provide in the basement a large room for parochial purposes. This room is in addition to vestries for the ministers and choir in the east end of the church. The church itself consists of a nave, 91 ft. long and 26 ft. wide, north and south aisles, with outer and inner porches at the west end of each aisle, the baptistery being in a projecting bay between the porches. The chancel is 40 ft. long, with a chapel 25 ft. by 15 ft. on the north side, and an organ chamber of similar dimensions on the south. The height of the edifice from floor to ridge is 55 ft. Local stone has been used for the walls and dressings, bath stone for the nave, arcade, and chancel arches, and the roof will be covered with green Westmoreland slates. The architect is Mr. Joseph Norton, Sheffield, whose plans were selected in an open competition, Mr. Ewan Christian being the assessor; Mr. L. T. Wildgoose, of Matlock Bank, is the contractor; and Mr. William Parnell, of Manchester, is clerk of the works.

NEW SCHOOLS, ST. LUKE'S CHURCH, WOLVERHAMPTON.—The memorial-stone was laid recently of the new schools in connexion with St. Luke's Church, Blakenhall. The new building, which adjoins the present schools, is intended to serve as a boys' school, and will accommodate about 130 scholars. Inside it will measure 70 ft. by 22 ft. The builder is Mr. H. Gough, of Wolverhampton, and the architect is Mr. F. T. Beck.

ALTERATIONS, BAPTIST CHAPEL, SALENDINE NOOK, YORKSHIRE.—Alterations to the Baptist Chapel, Salendine Nook, have just been completed. They embrace a new porch and vestibule, the reseating of the body and gallery of the chapel, the construction of an external staircase for the choir, and the provision within the shell of the old building of a series of rooms for the minister, the deacons, and others. The alterations and improvements are estimated to cost 3,500*l.*, and they have been carried out under the superintendence of Mr. B. Stocks, architect, Huddersfield.

CONGREGATIONAL CHURCH, MIDDLESBROUGH.—On the 20th ult. the foundation-stones of a new Congregational church at Middlesbrough were laid. The church will be cruciform in shape, with nave, aisles, double-gabled transepts and choirs. The architect is Mr. J. Mitchell Bottomley, of Middlesbrough and Leeds, and the contractors are Mr. John Johnson, Middlesbrough, and Mr. R. Snaith, Darlington. The total cost of the new church and premises for school, clubs, and other departments, is 7,500*l.*

ESTABLISHED CHURCH, TITWOOD, N.B.—The memorial stone of the Titwood Established Church was laid on the 18th ult. The church, which is estimated to cost 8,500*l.*, is cruciform in plan, and is being erected on a site at the corner of Glencairn Drive and Leslie-road. The principal entrance will be through a porch on the north front, and additional doors for exit will be provided at the south and east of the church. The nave seating will be entirely within the side aisle piers; a gallery will be placed in the north transept and also at the end of the nave, the pulpit being placed at one side of the entrance to the chancel, and the font on the other side. The organ will be divided, and occupy two arched recesses on each side of the chancel. The nave will be lighted from the clearstory windows, there being no windows in the aisle passages. The clearstory and the large west windows will be divided by mullions into three and six lights respectively, and have the upper parts filled with varied forms of tracery. The interior walling is to be finished with stone. The roof will be a pointed arch, lined with wood, and having rib mouldings at intervals between the main couples. Accommodation will be provided for over 1,000 sittings in the church, and a hall, session-house, vestry, ladies' room, &c., will be arranged to the east of the church. The style is fifteenth-century Gothic. It is intended at some future time to erect a tower in continuation of the north porch, and the walls and foundation there have been built with a view to this. The contractors are:—Mason and joiner work, Alexander Eadie & Son; plumbing work, W. Hendry & Son; plaster work, A. Calder & Son; and heating and ventilation, J. Boyd & Son. The entire work is being carried out under the superintendence of the architect, Mr. H. E. Clifford, I.A., Glasgow.

POST OFFICE, HELENSBURGH, DUMBARTON.—On the 20th ult. a new Post Office was opened at Helensburgh. The building occupies a central site at the corner of Colquhoun-square and Princes-street, with a frontage to the former of 46 ft., and to the latter of 78 ft. It consists of two stories, and the exterior elevations are in the Classic style. The dome and cupola on the circular corner of the building is a conspicuous feature. The freestone used was brought from Giffnock Quarry. On the ground floor is situated the public office, 20 ft. by 20 ft., which is entered by a porch with two doorways. Entering from this office are the postmaster's room and the telegraph instrument room. The sorting-room occupies the western side of the ground floor. On the second story are three rooms. The cost of the new building was about 5,000*l.* It was designed by Mr. W. W. Robertson, Surveyor for Scotland to H.M. Office of Works, Edinburgh. The contractor for the whole of the works was Mr. Alexander Miller, builder, Helensburgh; and the sub-contractors were Mr. John Dick, joiner; Mr. John Horner, plumber; Messrs. J. & W. Bain, smiths; Mr. William Gartshore, plasterer; Messrs. W. Thom & Son, slaters; Messrs. J. W. M'Culloch & Son, painters; and Messrs. J. & C. Malloch, glaziers. The work was under the superintendence of Mr. James A. Kennedy.

## *STAINED GLASS AND DECORATION.*

MEMORIAL WINDOW, LANIVET CHURCH, BODMIN.—A memorial window has just been placed in the parish church of Lanivet. It is of three lights and tracery in Perpendicular style. Three single figures of Abraham, Rebekah, and Daniel, occupy the greater portion of the main lights, and beneath them three subjects of scenes from their lives. In the tracery are angels bearing emblems. The work has been executed by Fouracre & Son, of Stonehouse, Plymouth.

THE LOWELL MEMORIAL IN WESTMINSTER ABBEY.—Mr. Leslie Stephen unveiled, on Tuesday, the memorial which has been placed in honour of the late James Russell Lowell at the entrance to the Chapter-house, Westminster Abbey. The memorial includes a window and a bust underneath. The window has been erected by Messrs. Clayton & Bell, and consists of three lights. In the centre is the figure of Sir Launfal, from Lowell's poem of that name, below is an angel with the Holy Grail, and in the lowest compartment the incident of Sir Launfal and the leper is represented. The right light has the figure of St. Botolph, the patron saint of the church at Boston, Lincolnshire, from which the Massachusetts city, Lowell's birthplace, derived its name; below is the landing of the Pilgrim Fathers. The light on the left contains the figure of St. Ambrose, below is a group representing the emancipation of slaves. In trefoils above the side-lights are shields bearing the arms of the United States and the United Kingdom.

## *FOREIGN AND COLONIAL.*

FRANCE.—M. Lucien Magne has recommenced at the École des Beaux-Arts his course of lectures on "The History of Architecture"; and M. Baudot has commenced, at the Trocadéro Museum, a course on "French Mediæval Architecture."——The Minister of Fine Arts has put at the disposition of M. Henri Cros, the sculptor, a studio at the Sèvres manufactory, where he can pursue some investigations in regard to the treatment of coloured glazed ware.——M. Louis Bonnier has obtained the first prize in the competition for Ivry Municipal Buildings. ——There is talk of a subscription being opened for the erection of a monument to Marshal MacMahon.——The competition at Bordeaux for the Girondin monument had been announced as awarded to M. Esquié (architect) in collaboration with M. Labatut (sculptor). Much surprise has therefore been caused by the announcement that the Municipality have changed their minds and awarded it to M. Dumilâtre and M. Rich. M. Daumet, as president of the Société Centrale, has protested energetically against this breach of faith with the first-named competitors.——M. Peynot, the sculptor, has finished the monument to be erected at Lyons to the Republic, and part of the work is already in place.——A new hospital for aged men has been opened at Pantin, intended especially for the communes of the north-east of Paris.——The statue of Chevreul at Angers will be inaugurated on Sunday week, December 9.——M. Henri Meurillon, architect, of Lille, has died at the age of sixty-eight. He was born at Armentières and was a pupil of the École Academique of Lille.——The Museum of Rouen has just received a statue by M. Gerôme, "La Douleur," as well as a military picture by Protais, and a series of drawings by Hippolyte Bellanger and Renouard; and Baron

Rothschild has given to the same museum a set of medals by M. Chaplain, including portraits of MM. Gerôme, Bonnat, and Meissonier. —Many of the artists who exhibit at the Champ de Mars Salon are anxious as to what will become of their exhibition room in the Palais des Beaux-Arts when the 1900 exhibition is to be prepared. The treasurer of the "Société National des Beaux-Arts," M. Dubufe, has stated through the Press that his society had acquired the right to occupy those galleries for its exhibition until 1898. They have already prepared plans for other and more suitable galleries after that date.

## *MISCELLANEOUS.*

ANNUAL DINNER, CARDIFF MASTER BUILDERS' ASSOCIATION.—The Cardiff Master Builders' Association held its fifth annual dinner at the Angel Hotel on the 22nd ult. There were about 130 present, over whom Alderman David Jones (President) presided. The President having proposed the loyal toasts, Mr. W. Geen submitted "The Army, Navy, and Reserve Forces," to which Captain Bruce Vaughan responded. Mr. J. Strachan proposed "Cardiff," and Mr. W. Thomas proposed the "Architects and Engineers." Messrs. Edwin Seward and S. Rooney replied. Mr. Seward mentioned that the South Wales Association of Architects had been directly allied to the Royal Institute, and examinations would be held in Cardiff. He pointed out that there was necessity for some arrangement with operative masons and plasterers for an increase in the number of apprentices if those trades were to maintain their necessary strength. Mr. F. H. Lock then, on behalf of the Association, presented to the President a casket, containing an illuminated address, on his retirement from the more active duties of business. The address expressed the high esteem in which Alderman David Jones was held, not only by the Association, but by the general community of Cardiff. The President thanked the members for the kindness which they had shown him that evening and on all occasions in connexion with the Association. Other toasts followed.

OAK TRIPTYCH, OLD ST. PAUL'S CHURCH, EDINBURGH.—On the 19th ult., in Old St. Paul's Church, Jeffrey-street, Edinburgh, Bishop Dowden dedicated the new triptych which has just been erected over the altar table. It is the gift of Miss Cranston, of Waverley Park, and is of Gothic design, decorated with carved niches and foliated cornices, and crocketed finials. There are also in the various niches and on the pinnacles carved figures of saints and angels, numbering forty-one in all, and so arranged as to have reference to the subjects selected for treatment—"Christus Propheta," "Christus Sacerdos," "Christus Rex," "Christus Salvator." Immediately over the re-table is a cornice enriched with small niches containing the twelve Apostles with their emblems. In the large centre panel over this is to be placed a painting copied from the "Holy Child Jesus with Madonna Enthroned," by "Benvenuto da Siena," in the National Gallery, London. The two side wings of the triptych are divided from the centre panel by a series of canopies and niches, with the sculptured figures already mentioned. At about 20 ft. from the floor the whole is surmounted by a cresting varying in design over the centre panel, with shields bearing the emblems of the Passion. The two wings or doors of the triptych are hinged so as to fold over and enclose the centre. They are decorated with diaper work in gold and colours. Two spires of finials rise over the canopied piers to a height of about 26 ft. above the chancel floor, the width across the extended wings being 16 ft. Most of the work has been laid with gold leaf, the hollows only being picked out in dark red. The figures and the carved "Pieta" panel are the work of Sebastian Zwink, of Oberammergau. All the rest of the work, including the angels holding scrolls, is by Mr. John Gibson, wood carver, and the gilding and colouring is by Doig & M'Kechnie. The whole of the work has been executed from designs and full-sized drawings prepared by the architects, Messrs. Hay & Henderson, Edinburgh.

REREDOS AT PETERBOROUGH CATHEDRAL.—The family of the late Dean Saunders is about to erect a reredos to his memory in Peterborough Cathedral. The reredos, we understand, has been designed by Mr. Pearson, R.A.; and, according to the *Bristol Times and Mirror*, will harmonise with the chancel. At the four corners of an alabaster canopy there will be figures representing the Four Evangelists. The figure at the eastern end will be that of St. Peter, the patron saint of the Cathedral. The work has been carried out by Mr. R. Davidson, of London.—An Aberdeen granite memorial to the late Mr. H. P. Gates has just been completed in the cemetery attached to the Cathedral. The memorial has been executed by Mr. J. Thompson, of Peterborough, Mr. Ruddle supplying the design.

MEASURING TILING.—A correspondent writes to ask "whether we are entitled in measuring tiling to take 6 in. for cutting (or running out) eaves in addition to the usual allowance for cutting, namely, 8 in." The practice in the measurement of roof-tiling is, according to the text-books (*e.g.*, Hurst and Laxton), to allow an extra 4 in. in width for ordinary eaves, 6 in. for dripping eaves, 3 in. for raking cutting. London surveyors usually measure 6 in. extra for all eaves to begin with, and an extra 3 in. where there is a raking edge—in the case, for example, of a lead or zinc gutter between two internal slopes. In some parts of the country as much as 12 in. extra is allowed for all eaves.

DRAINAGE OF SOUTHWOLD, SUFFOLK.—Colonel C. H. Luard, R.E., one of the inspectors of the Local Government Board, held an inquiry at the Town-hall, Southwold, on the 24th ult., for the purpose of taking evidence in respect of the application by the Town Council for a loan of 5,000*l.* to carry out the scheme of Mr. Frederick Beesley, C.E., of Westminster, for the drainage of the town.

THE ART UNION OF LONDON.—We have received an impression of the presentation plate to subscribers this year, an etching by Mr. Macbeth, of Mr. H. W. Davis's "Summer Time"; a good reproduction of a fine work.

## *LEGAL.*

### A QUESTION OF DRAINAGE.

IN the Chancery Division on Thursday, November 23, judgment was given by Mr. Justice Romer in the case of Stretton's Derby Brewery Company (Limited) *v.* the Mayor and Corporation of Derby, it being an action for an injunction by the plaintiffs, the owners and occupiers of a brewery abutting on Ashbourne-road, in the borough of Derby, against the defendants, the Corporation of Derby, acting by the Town Council, as the Urban Sanitary Authority of the borough.

It appeared that many years ago, in exercise of their statutory duties, the defendants provided a system of drainage for the district, and as part of that system made the sewer that passes under the road in which the plaintiffs' brewery was situated. The brewery was erected some years after the sewer was made, part being built in 1869, and other parts in 1876, 1880, and 1881. As the different parts of the brewery were erected, the owners for the time being exercised their statutory rights and drained them into the sewer by communications which had to be, and were, first approved of by the defendants. These communications respectively ran to the sewer from the floors of the cellars of the several parts of the brewery, which floors were slightly above the crown of the sewer, so that the cellars could not be flooded from the sewer until the sewer got filled and a pressure was caused in it, which forced the contents of the sewer up the communications through the floors of the cellars. On June 25, 1891, a heavy storm occurred which blocked the sewer and drove the sewage up the plaintiffs' communications to their cellars, and flooded the cellars for a short time for a depth of about 3 ft., and, after the flood retired, left some inches or so of sewage matter on the floors of the cellars. This caused damage to the plaintiffs, and they complained to the defendants. In May and June other floodings occurred, and the plaintiffs made further complaint of the damage they had sustained. The action was commenced in August, 1892, and another flooding occurred in July, 1893. The learned judge found in making their existing system of drainage, and in constructing the sewer, the defendants had exercised due care and were not guilty of negligence. He also found that when the communications between the brewery and the sewer were made, and for some years afterwards, the sewer was well constructed and sufficient for the purposes of draining the district, and could cause no flooding, or probability of flooding, to the brewery. It was also established that the floodings did not arise from any want of repair in the defendants' sewer.

Mr. Justice Romer, in giving judgment, found that the defendants, up to the time when the action was commenced, or up to the date of the trial, were not guilty of negligence or of want of reasonable care and diligence in maintaining the existing sewer, and in not providing a new sewer or system of drainage, and that therefore they could not be held liable under Section 19 of the Public Health Act, 1875.

The action, therefore, was dismissed with costs.

## MEETINGS.

SATURDAY, DECEMBER 1.

*Institution of Civil Engineers (Students' Meeting).*—Mr. Leonard H. Appleby on "Forms of Tensile Test Pieces." 7.30 p.m.

MONDAY, DECEMBER 4.

*Royal Institute of British Architects.*—General Meeting (Business) for members only. 8 p.m.

*Surveyors' Institution.*—Mr. R. Godfrey on "The Local Government Bill, 1893." 8 p.m.

*Society of Engineers.*—Mr. Perry F. Nursey on "Some Practical Examples of Blasting." 7.30 p.m.

*London Institution.*—Lecture by Professor C. V. Boys entitled "When and Why an Electric Spark Oscillates." 5 p.m.

*Liverpool Architectural Society.*—A Series of Lantern Slides, illustrative of English and Continental Architecture, to be exhibited by Mr. G. E. Thompson. 6.30 p.m.

*Leeds and Yorkshire Architectural Society.*—Professor Goodman on "Testing Materials"—a practical demonstration. 7.30 p.m.

*Society of Arts (Cantor Lectures).*—"The Art of Book and Newspaper Illustration," by Mr. Henry Blackburn: II. 8 p.m.

TUESDAY, DECEMBER 5.

*Institution of Civil Engineers.*—Resumed Discussion upon the papers on "Impounding Reservoirs in India, and the Design of Masonry Dams," by Mr. Clerke, Mr. Sadasewjee, Colonel Jacob, and Professor Kreuter. 8 p.m.

*Society of Biblical Archæology.*—8 p.m.

*Glasgow Architectural Association.*—Mr. A. N. Paterson on "Planning of Hospitals." 8 p.m.

WEDNESDAY, DECEMBER 6.

*South Kensington Museum (Lecture Hall).*—Lectures on "Greek Sculpture," by Miss E. Sellers: III. "Skopas." 5 p.m.

*Builders' Foremen and Clerks of Works' Institution.*—Ordinary Meeting. 8.30 p.m.

*Liverpool Engineering Society.*—Mr. F. M. Evanson on "Water-Saving Machinery." 8 p.m.

*Institution of Civil Engineers of Ireland (Dublin).*—Meeting to be held at 35, Dawson-street.

*Royal Archæological Institute of Great Britain and Ireland.*—(1) Mr. Talfourd Ely, M.A., F.S.A., on "Athena and Enceladus as Represented on a Greek Vase"; (2) Mr. J. H. Round, M.A., on "The Introduction of Armorial Bearings into England." 4 p.m.

*British Archæological Association.*—(1) Mr. J. T. Irvine on "Discovery of Part of the Saxon Abbey Church, Peterborough"; (2) Dr. Russell Forbes on "The Excavation of the Stadium on the Palatine Rome." 8 p.m.

*Society of Arts.*—Mr. Frederic Villiers on "An Artist's View of Chicago and the World's Fair." 8 p.m.

THURSDAY, DECEMBER 7.

*University College.*—Lectures on Greek Sculpture: "Pheidias to Lysippus," by Professor Percy Gardner. VIII. "Lysippus." 5 p.m.

*Society of Antiquaries.*—8.30 p.m.

FRIDAY, DECEMBER 8.

*Architectural Association.*—Mr. Owen Fleming on "The Inefficiency of the Modern Workman." 7.30 p.m.

*Sanitary Institute (Lectures on the Sanitation of Industries and Occupations).*—Professor T. Oliver on "Metallic Poisons, Lead and Arsenic." 8 p.m.

*Junior Engineering Society.*—Mr. S. Cutler, Jun., on "Coal-Gas Manufacture and Recent Improvements of the Plant employed therein." 8. p.m.

*Institution of Civil Engineers.*—Students' Visit to inspect the Cask-making Machinery at Messrs. A. Ransome & Co.'s Works, King's-rd., Chelsea. 2.30 p.m.

## RECENT PATENTS.

### ABSTRACTS OF SPECIFICATIONS.

20,271.—REVERSIBLE WINDOWS: *John Lumley and Thomas Linskill.*—This improvement consists in the special construction of the meeting faces of the sash and hanging slides, which are formed of plates of metal, shaped to form rebate or weather-guards by locking together, such metal-plates also altogether obviating sticking from moisture, and allowing complete and easy reversal of the sashes, which are secured by special latches when closed.

23,177.—EARTHENWARE SANITARY PIPES, &c.—*Reginald Stanley.*—This invention relates to an improved machine for manufacturing such pipes by moulding, and especially for the supply of a stream of plastic clay to the mould to form the sockets by suitable dies.

23,636.—DOMESTIC FIRE-GRATES.—*William Allardyce.*—The object of this invention is to ensure the consumption of smoke and gases arising from newly-added fuel, which is effected by making the grate in the shape of a box, mounted in the sides of the stove, so as to be capable of rotation. When fresh fuel is added, a half-turn is given by a lever, and the freshly-added fuel, being brought to the bottom of the grate, has to send its products of combustion through the incandescent fuel then above it.

17,538.—SYPHON FLUSHING CISTERNS: *Johann D. Möller.*—This invention relates to flushing cisterns for water-closets, &c., in which a bell syphon is provided in the cistern. It is arranged by passing through the bottom thereof, the said cistern being provided with an exteriorly-pivoted arm and float.

16,237.—BRICK-MAKING MACHINES: *Samuel E. Haskin.*—In a machine of the rotary type the compression-wheel is, according to this invention, converted into another mould-wheel, so that two bricks are formed simultaneously. This obviates the formation of pencils or rolls of clay by the impact of an inflexible pressure-wheel

17,558.—THIN PLASTERS ON CEMENT WALLS: *Theodor Lehmann.*—This invention relates to forming thin partition walls without wood or metal lattice-work for foundation or support. Grooves are cut in the opposite walls of the room, and the door-frame supported in its proper position. Boarding is then temporarily fixed in the grooves, the plaster or cement built up against this, and the boarding then removed. Floor-cement, with stucco-plaster and sand, is the best material. Walls of 13 ft. in height can thus be built.

### NEW APPLICATIONS FOR LETTERS PATENT.

NOVEMBER 13.—21,561, T. Houghton, Sash-fastener.—21,562, J. Houghton, Joint to Meeting Rails of Sashes.—21,587, G. Newman, Door-closing Springs and Cheeks.—21,643, The Patent Victoria Stone Company, Limited, and J. Phillips, Gully Catch-pits and Traps.

NOVEMBER 14.—21,688, T. Geggie, Window Sashes.—21,728, A. Bridgman and D. Horse, Saw Benches and Sawing Machines.

NOVEMBER 15.—21,763, G. Kirk, Chipper Blocks for Wood Moulding Machines.—21,795, W. Young, Hanging Window Sashes.—21,799, G. Gray and C. Batstone, Constructing Window Sashes.—21,801, J. & W. Horsfall, Window Draught-excluder, Burglar Proof, and Prevention of Rattling in Stormy Weather.—21,841, M. Smith, Ceiling Decoration.

# COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

## COMPETITIONS.

| Nature of Work. | By whom Advertised. | Premiums. | Designs to be delivered |
|---|---|---|---|
| Isolation Hospital | Blaydon-on-Tyne Loc. Board | ..... | Dec. 7 |
| School Buildings, Stoneyholme (Local) | Burnley Sch. Bd. | ..... | Dec. 18 |
| *Shelters, Sea Baths, &c. &c. | Southend-on-Sea Corp. | 20l. 15l. and 10l. | Jan. 31'94 |
| *Conservative Club, Sandown, Isle of Wight | The Committee | 5l. 5s. 2l. 2s. | No date |

## CONTRACTS.

| Nature of Work or Materials. | By whom Required. | Architect, Surveyor, or Engineer. | Tenders to be delivered. |
|---|---|---|---|
| Additions to School Buildings, Denton Holme | Carlisle School Board | T. Taylor Scott | Dec. 5 |
| Levelling, Metalling, &c. Sunbury-lane, Walton-on-Thames | Chertsey R.S.A. | *Official* | do. |
| Roads at Workhouse | Leeds Union | do. | do. |
| *Cast-Iron Work | Com. of Sewers, City of London | do. | do. |
| Labourers' Cottages, Maynetown and Suggborough | North Dublin Union | do. | Dec. 6 |
| Eight Cottages, Whetley Hill, Bradford, Yorks | ..... | Walker & Collinson | do. |
| Sewering, Kerbing, &c. Portland-place | King's Lynn Corp. | E. J. Silcock | do. |
| Engine and Boiler House, &c. | Ealing Local Board | Bramwell & Harris | do. |
| Covering Platform, &c. | Southend Pier Com. | C. T. Copley | do. |
| Sewerage Works, Pipes, &c. | Great Harwood (Lancs) Local Board | Brierley & Holt | do. |
| Paving, Quarrying, &c. | Halifax Corporation | E. B. S. Escott | do. |
| Improvement Works, Thorntree and other Streets | do. | do. | do. |
| Hotel, Miskin, Mountain Ash, Glam. | ..... | T. Roderick | do. |
| Rebuilding No. 73, Commercial-road, Newport, Mon. | Thos. James | W. H. Watling | do. |
| Sewerage, Roadmaking, &c. Meyrick Park | Bournemouth Twn C. | F. W. Lacey | Dec. 7 |
| School Buildings, St. Albans-road | Dartford School Board | G. H. Tait | do. |
| Footways, &c. Ashley-road | Poole Town Council | Jno. Elford | do. |
| Drainage Works, Liberty Hall Estate, Addlestone | R. Steer | ..... | do. |
| Alterations, &c. to Police Stations, Barry and Pandy | Glamorgan C. C. | *Official* | Dec. 8 |
| Police Stations, Taff's Well and Hirwain | do. | do. | do. |
| *Underground Water Tank | Vestry of St. Pancras | H. Robinson | do. |
| Additions to School Buildings, near Whitby | Fryup Board School Committee | E. H. Smales | Dec. 9 |
| Additions to School Buildings | Risca (Mon.) Sch. Bd. | Geo. Rosser | Dec. 11 |
| Artisans' Dwellings, Sharlston, near Wakefield | ..... | Milnes & France | do |
| *Sewerage Works | Devonport Town Coun. | *Official* | do |
| *Wembley Park Drainage | Hendon R.S.A. | do. | do |
| *School of Art, Science, &c. | Dover Town Council | do. | Dec. 12 |
| Building Youden's Court, &c. Clarendon Estate | do. | do. | do. |

## CONTRACTS—*Continued.*

| Nature of Work or Materials. | By whom Required. | Architect, Surveyor, or Engineer. | Tenders to be delivered. |
|---|---|---|---|
| *Stoneware Pipes, Bends and Junctions | Norwich Corporation | L. P. Marshall | Dec. 12 |
| Brick Sewers, Excavations, &c. | Droylsden (Lancs.) Loc. Board | W. Hurst | do. |
| Jetty, near Pier | Llandudno Impt. Com. | E. P. Stephenson | Dec. 12 |
| *Granite Edge Kerb, &c. &c. | Plumstead Bd. of Wks. | *Official* | do. |
| Eight Dwelling Houses, &c. Dubcross, near Oldham | ..... | Jno. Kirk & Sons | do. |
| Brick Gasholder Tank | Harrogate Gas Co. | T. Newbigging | Dec. 14 |
| *Stores and Materials | Nottingham Corp. | A. Brown | do. |
| Clock Tower, Cattle Market | Salford Corp. | *Official* | do. |
| Sewerage Works, Newbridge District | Wolverhampton Corp. | R. E. W. Berrington | Dec. 16 |
| Engine and Boiler Houses, at Pumping Station | Glasgow Corp. | Ellington & Woodall | do. |
| Sewerage Works, Tanks, &c. | Walton-le-Dale L.B. | J. F. Spencer | do. |
| *Sewerage Works | Stockport Corp. | A. M. Fowler | Dec. 18 |
| *New Baths, Winter Gardens, &c. | Harrogate Corporation | Baggallay & Bristowe | do |
| School Buildings, Manor-road | West Ham Sch. Bd. | Newman & Jacques | Dec. 19 |
| Waiting Rooms, Walls, &c. Pembrey | G. W. R. Co. | *Official* | do. |
| Storage Tank, &c. | Blackrock and Kingstown Drainage Board | W. G. Strype | Dec. 20 |
| *Drill Shed, &c. Hove | Admiralty | *Official* | Dec. 21 |
| Steel Girder Bridge, Dundalk | G. N. R. Co. (Ireland) | W. H. Mills | Dec. 22 |
| Water Supply Works | Gainsborough Loc. Bd. | Jabez Church | Jan. 16'94 |
| Lunatic Asylum, Blackburn | ..... | Stones & Gradwell | Jan. 29 |
| Shops and Storerooms, Woodstone, Peterborough | E. Sellars | M. Hall | No date |
| Shaft Sinking, Mountain Mine, Chorley, Lancs. | ..... | Mr. Rigby | do. |
| Flooring Church, Dartmouth | ..... | Edmund Sedding | do. |
| Additions to "Claremont" Hotel, Harrogate | ..... | T. B. Wilson | do. |
| Warehouse, Robert's Yard, Burnley | ..... | V. Dunkerley | do. |
| Pair Semi-Detached Villas, Menston, Yorks | ..... | F. Moore | do. |
| Additional School Buildings, Linton, Cambs. | Rev. J. C. Longe | ..... | do. |
| *Foundations of Piers, &c. for Bridge | ..... | ..... | do. |

## PUBLIC APPOINTMENTS.

| Nature of Appointment. | By whom Advertised. | Salary. | Applications to be in. |
|---|---|---|---|
| *Junior Architectural Assistants | London County Council | ..... | Dec. 5 |
| *Temporary Architectural Assistant | Harrogate Corp. | 2l. | Dec. 9 |
| *Building Inspector and Borough Engineer's Assistant | St. Helens Corp. | 2l. per week | Dec. 11 |
| *Foremen of Works, Lagos | Crown Agents for Colonies | 250l. &c. | do. |
| *Chief Sanitary Inspector | Rotherhithe Vestry | 200l. | Dec. 13 |
| *Surveyor | do. | 300l. &c. | do. |
| *Clerk of Works | Tottenham Local Bd. | 3l. 10s. | Dec. 15 |
| *Engineer's Assistant | Wakefield R.S.A. | 100l. | Dec. 16 |

*Those marked with an Asterisk (*) are advertised in this number.* *Competition, p.* iv. *Contracts, pp.* iv., vi., *and* viii. *Public Appointments, pp.* xxi. *and* xxiii.

NOVEMBER 16.—21,867, E. Green, Drain Traps.—21,872, F. Maclean and R. Kay, Hingeing Sliding Sash-windows, to Open Inwards.—21,876, G. Dean, Hoffman's Kiln.—21,878, J. Holloway, Sewage Outfall Grid.—21,892, J. Stokes, Plough Irons for Plough Planes.—21,900, J. Sharp, Firegrates.—21,907, C. McDonald, Guiding and Working Reciprocating Saws.—21,925, L. Meyhoefer, Flush Bolts for Doors, &c.

NOVEMBER 17.—21,971, H. Blake and G. Day, Sash Hanging.—21,981, C. Köote, Starting Syphons in Flushing Cisterns.—22,015, J. Lowe, Flooring Cramps.

NOVEMBER 18.—22,072, J. Slater, Fire-grates.—22,085, G. Wallis, Pug or Mortar Mills.—22,084, W. Scott-Moncrieff, Apparatus for Levelling.—22,093, W. Bannochie, Fire-grates.—22,103, A. Boult, Mortar, &c.—22,105, H. Defries, Window-frames.—22,130, O. Holter, Stoves.

### PROVISIONAL SPECIFICATIONS ACCEPTED.

15,457, H. Wardingly and W. Cooke, Attachment for the Connexion of Window or other Cords.—17,331, A. Mary, Processes for the Production of White Lead.—18,476, C. Hall and T. Wyatt, Combination Mitre-cut and Cramp.—19,101, W. Farrar, Window Ventilator.—20,056, R. Harry, Preventing the Rattling of Windows.—20,253, W. Walters and F. Stone, Preservative Coating for Iron and Steel.—20,727, J. Cope, Preventing the Escape of Sewer-gas.—20,740, J. Kelly, Ball-water Hydrants.—20,876, W. Dodd, Fixing Glass in Windows.—20,880. E. Dickinson, Weather Boards or Draught Preventers.—20,042, T. Lees, Wood Planing Machines.—20,061, T. Elgar, Hanging Window Sashes.

### COMPLETE SPECIFICATIONS ACCEPTED.

*(Open to Opposition for Two Months.)*

20,781, S. Holman, Apparatus for Heating and Ventilating, more especially intended for use in creating Currents for the Ventilation of Sewers.—21,245, C. Fitzgerald, Glazing.—1,067, J. Sherson and H. Crisp, Tops or Guards for Chimneys and Ventilating Shafts.—13,479, F. Glass, Hydraulic Lifts and Cranes.—17,620, A. & H. Clark, Window Fastener.— 9,439, E. Dandy, Upholstery Hooks.

## SOME RECENT SALES OF PROPERTY:

### ESTATE EXCHANGE REPORT.

NOVEMBER 16.—By *Dyer, Son & Hilton* (at East Grinstead): "The Clacks" and 1 a. 0 r. 29 p., near Lingfield, f. 280*l.*; a Plot of f. land, Crawley Down, 60*l.*; an enclosure of f. land, 2 a. 1 r., 165*l.*

NOVEMBER 20.—By *W. Houghton:* 56, South Grove, Walthamstow, and 2, Side-rd., u.t. 44 yrs., g.r. 2*l.*, 175*l.*; 36, Cornwallis-rd., Holloway, u.t. 70 yrs., g.r. 6*l.* 6s., r. 32*l.*, 250*l.*—By *E. Wood:* 9 to 39 odd, Shaftesbury-st., Tottenham, u.t. 88 yrs., g.r. 42*l.*, 575*l.*; 150, The Grove, Hammersmith, u.t. 898 yrs., g.r. 10*l.*, 300*l.*—By *Collier & Henderson:* 39, North-st., Edgware-rd., and 88, Salisbury-st., u.t. 28 yrs., g.r. 30*l.*, r. 91*l.*, 330*l.*—By *Montagu & Robinson:* 14, 15, Stewart-st., Spitalfields, f.r. 105*l.*, 1,605*l.*; 21, Stewart-st., and 5, Fort-st., f.r. 80*l.*, 910*l.*; "The Warren," Clapham Pk., and 1¾ acres, u.t. 31 yrs., g r. 25*l.*, r. 60*l.*, 360*l.*; 13 to 23 odd, Hanover-st., Peckham, u.t. 34 yrs., g.r. 20*l.*, r. 189*l.*, 1,400*l.*; 35, 37, 42, Lyndhurst-rd., f., r. 118*l.*, 1,530*l.*; 3, Elm-grove, u.t. 34 yrs., g.r. 2*l.*, r. 16*l.*, 155*l.*; No. 16A, Stockwell Pk. Cres., u.t. 32 yrs., g.r. 1*l.* 3s., r. 57*l.*, 375*l.*

NOVEMBER 21.—By *P. H. Clarke:* 94, Grove Lane, Camberwell, u.t. 60 yrs., g.r. 10*l.*, r. 46*l.*, 405*l.*—By *Bean, Burnett, & Eldridge:* 284, Friern-rd., Dulwich, u.t. 67 yrs., g.r. 6*l.* 6s., 200*l.*; 36 to 42 (even), Carlingford-rd., West Green, u.t. 97 yrs., g.r. 20*l.*, r. 120*l.*, 905*l.*; 30, King-st., Portman-sq., u.t. 29 yrs., g.r. 50*l.*, 640*l.*—By *Oakley, Fisher, & Co.:* 8, Alfred-st., City-rd., u.t. 32 yrs., g.r. 4*l.* 5s., r. 40*l.*, 280*l.*; 95, Cloudesley-rd., Islington, u.t. 30 yrs., g.r. 5*l.*, r. 42*l.*, 255*l.*; No. 229, Gray's Inn-rd., u.t. 8 yrs., g.r. 5*l.* 5s., r. 65*l.*, 320*l.*; 136, Leighton-rd., Kentish Town, u.t. 42 yrs., g.r. 6*l.*, r. 40*l.*, 285*l.*; 69, 71, 73, King's-rd., Camden Town, u.t. 6½ yrs., g.r. 19*l.* 19s., 110*l.*; 2, 3, Little Coram-st., Brunswick-sq., u.t. 4 yrs., g.r. 12*l.* 12s., r. 60*l.*, 65*l.*; 8, Cunningham-pl., St. John's Wood, u.t. 29 yrs., g.r. 10*l.*, r. 60*l.*, 370*l.*; 1, Goldsmith-pl., Kilburn, u.t. 50 yrs., g.r. 2*l.*, r.c. 3*l.*, r. 24*l.*, 225*l.*; 7, Trevor-pl., Knightsbridge, u.t. 19 yrs., g.r. 7*l.*, r. 50*l.*, 360*l.*; 24, Montpelier-pl., Brompton, u.t. 34 yrs., g.r. 7*l.* 7s., r. 21*l.*, 195*l.*; 47, Smith-st., Chelsea, u.t. 2 yrs., g.r. 19*l.* 19s., r. 50*l.*, 20*l.*

NOVEMBER 22.—By *T. N. Turner:* 19, Milton-rd., Stoke Newington, f., r. 32*l.*, 440*l.*—By *J. & R. Kemp & Co.:* 45 and 47, Torriano-Av., Camden-rd., u.t. 51 yrs., g.r 14*l.*, r. 96*l.*, 760*l.*—By *R. Tidey & Son:* 104, Albion-rd., Dalston, u.t. 47 yrs., g.r. 2*l.* 10s., 305*l.*: 48, Packington-st., Islington, u.t. 43 yrs., g.r. 6*l.* 6s., r. 55*l.*, 400*l.*; 4, Prebend-st., u.t. 43 yrs., g.r. 5*l.*, r. 55*l.*, 425*l.*; 56, Bryantwood-rd., Holloway, u.t. 70 yrs., g.r. 6*l.* 10s., r. 38*l.*, 335*l.*—By *Woods & Snelling:* 68, Farm Lane, Walham Green. Sold before Auction.—By *Spearman, Climpson & Johnson:* 31, Brunswick-st., Hackney, u.t. 23 yrs., g.r. 12*l.* 16s., r. 32*l.*, 75*l.*; 38, 40 and 42, Walsingham-rd., Clapton, f.r. 85*l.*, 1,130*l.*; 131 and 131A, London Wall, City of London, i.g.r. of 120*l.*, u.t. 63 yrs., 2,210*l.*—By *Oakley, Fisher & Co.:* 7, Little Marylebone-st., Marylebone, u.t. 4 yrs., g.r. 12*l.*, 120*l.*; 53, Queen Anne-st., Cavendish-sq., u.t. 3 yrs., g.r. 52*l.*, r. 135*l.*, 200*l.*; Improved rental, 52*l.* 10s., Winsley-st., Oxford-st., u.t. 18 yrs., 545*l.*; 2, Belgrave-mews, Belgravia, l.g.r. of 14*l.*, u.t. 10 yrs., 95*l.*; 46, Davies-st., Berkeley-sq., u.t., 2 yrs., g.r. 40*l.*, r. 150*l.*, 100*l.*

NOVEMBER 23.—By *H. Stacey:* 1 and 2, St. Mark's Cottages, Reigate, f., r. 14*l.*, 2,000*l.*; a plot of land, Almard., f., r. 60*l.*, 950*l.*; "Reigate Hill Lodge" and "Greenpoint," u.t. 54 yrs., g.r. 10*l.*, r. 115*l.*, 1,000*l.*; f.g.r. of 15*l.* 15s., Park-st., Stoke Newington, Reversion in 75 yrs., 410*l.*—By *J. T. Ayton:* 114, Pennington-st., St. George's-in-E., f., 110*l.*—By *Geo. Gouldsmith, Son & Co.:* 127, Beaufort-st., Chelsea, u.t. 80 yrs., g.r. 9*l.* 10s., 600*l.*—By *Phillips, Lea & Davies:* "Fisher Green," King's-rd., Richmond, f., 1,310*l.*—By *C. P. Whiteley:* 28, Deacon-st., Walworth, u.t. 49 yrs., g.r. 6*l.*, r. 42*l.*, 355.—By *F. J. Bisley & Sons:* 45, Adam's Gardens, Rotherhithe, f., 160*l.*; 4 and 6, Neptune-st., f., 610*l.*; 34 and 36, St. Mary Church-st., f., r. 53*l.*, 805*l.*

NOVEMBER 24.—By *Boyce & Evens:* 30, Westmoreland-pl., City-rd., f., r. 36*l.*, 405*l.*; 67 to 77 odd, De Beauvoir Cres., Kingsland, u.t. 25 yrs., g.r. 22*l.* 10s., r. 184*l.*, 900*l.*; 13, Curzon-st., Hoxton, u.t. 37 yrs., g.r. 2*l.* 17s. 6d., r. 30*l.*, 230*l.*; 37, 38, Murray-st., u.t. 49 yrs., g.r. 10*l.* 10s., r. 66*l.*, 500*l.*—By *R. Reid:* No. 188, Oxford-st., u.t. 50 yrs., g.r. 200*l.*, 7,000*l.*; No. 52, Regent's Pk.-rd., u.t. 54 yrs., g.r. 17*l.*, r. 110*l.*, 900*l.*; 36, 38, 42, Regent's Pk.-rd., u.t. 54 yrs., g.r. 49*l.*, 2,230*l.*—By *Thurgood & Martin:* 228 to 234 even, Sebert-rd., Forest Gate, f., r. 105*l.*, 1,045*l.*; 216 to 224 even, Sebert-rd., f., r. 93*l.*, 975*l.*; 153, 177, 179, Sebert-rd., f., r. 81*l.*, 870*l.*; 7, 9, Lorne-rd., f., r. 51*l.*, 480*l.*; 15, Cranmer-rd., f., r. 24*l.*, 305*l.*; A plot of f. land, Sebert-rd.. 200*l.*; "West Ham Hall" and 1 a. 2 r. 20 p., 1,700*l.*; 26, Avenue-rd., f., r. 31 10s., 255*l.*; East Barnet-rd., Barnet, f. house and shop, r. 25*l.*, 260*l.*

*[Contractions used in these Lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.]

## PRICES CURRENT OF MATERIALS.

### TIMBER.

| | | |
|---|---|---|
| Greenheart, B.G. | ton | 9/0/0 0/0/0 |
| Teak, E.I. | load | 9/10/0 15/10/0 |
| Sequoia, U.S.ft.cu | | 2/3 2/6 |
| Ash, Canada load | | 2/5/0 3/10/0 |
| Birch, do. | | 2/5/0 3/5/0 |
| Elm, do. | | 3/0/0 4/5/0 |
| Fir, Dantsic, &c. | | 1/5/0 2/10/0 |
| Oak, do. | | 2/15/0 5/0/0 |
| Canada | | 5/10/0 7/0/0 |
| Pine, Canada red | | 2/15/0 3/5/0 |
| Do. Yellow | | 2/10/0 4/15/0 |
| Lath, D'antsic, &c. | | 4/10/0 5/10/0 |
| St. Petersburg | | 5/0/0 6/10/0 |
| Wainscot, Riga, &c., log | | 2/10/0 4/15/0 |
| Odessa, crown | | 2/10/0 4/15/0 |
| Deals, Finland | | |
| 2nd & 1st std 100 | | 8/0/0 10/10/0 |
| Do. 4th & 3rd | | 7/10/0 8/0/0 |
| Do. Riga | | 7/10/0 9/0/0 |
| St. Petersburg, 1st yellow | | 10/0/0 13 10/0 |
| Do. 2nd yellow | | 8/0/0 9/0/0 |
| Do. white | | 8/10/0 11/0/0 |
| Swedish | | 8/0/0 16/0/0 |
| White Sea | | 8/0/0 16/10/0 |
| Canada, Pine 1st | | 22/10/0 29/10/0 |
| Do. do. 2nd | | 17/0/0 18/10/0 |
| Do. do. 3rd &c. | | 7/10/0 10/10/0 |
| Do. Spruce, 1st | | 9/0/0 11/0/0 |
| Do. do. 3rd & 2nd | | 6/10/0 7/15/0 |
| New Brunswick | | 6/0/0 7/5/0 |
| Battens, all kinds | | 3/0/0 15/0/0 |
| Flooring boards, sq., 1 in. prep. 1st | | 0/10/6 0/15/0 |
| Do. 2nd | | 0/7/3 0/12/6 |
| Other qualities— | | 0/5/3 0/7/0 |
| Cedar, Cuba ..ft. | | ¼ ¼ |
| Honduras, ..&c | | 3/4 ¼ |
| Mahogany, Cuba | | 4 6½ |
| St. Domingo, cargo av. | | ⅓ 2/6 |
| Mexican do. do. | | 3/4 ¼ |
| Tobasco do. do. | | 3/4 ⅜ |
| Honduras do. | | ¼ 5/8 |
| Box, Turkey | ton | 4/0/0 15/0/0 |
| Rose, Rio | | 8/0/0 20/0/0 |
| Bahia | | 7/0/0 18/0/0 |
| Satin, St. Domingo | | 0/0/6 0/1/3 |

### TIMBER (*continued*).

| | | |
|---|---|---|
| Satin, Porto Rico | | 0/0/7 0/1/8 |
| Walnut, Italian | | 0/0/3½ 0/0/7 |

### METALS.

| | | |
|---|---|---|
| Iron—Pig, in Scotland | ton | 2/3 0/0/0 |
| Bar, Welsh, in London | | 5/15/6 6/0/0 |
| Do. do. at works in Wales | | 5/7/6 5/10/0 |
| Do. Staffordshire, in London | | 6/0/0 6/10/0 |
| COPPER—British cake and ingot | | 45/10/0 46/0/0 |
| Best selected | | 46/5/0 46/15/0 |
| Sheets, strong | | 54/0/0 0/0/0 |
| Chili, bars | | 43/1/3 43/6/3 |
| YELLOW METAL | lb | 0/0/4½ 0/0/5 |
| LEAD—Pig, Spanish | ton | 9/11/3 9 12/6 |
| English com. brands | | 9/15/0 9/0/0 |
| Sheet, English, 6 lbs. per sq. ft. and upwards | | 11/0/0 0/0/0 |
| Pipe | | 11/10/0 0/0/0 |
| ZINC—English sheet | ton | 20/15/0 0/0/0 |
| Vieille Montagne | | 21/5/0 0/0/0 |
| TIN—Straits | | 75/7/6 75/17/6 |
| Australian | | 75/17/6 76/0/0 |
| English Ingots | | 79 10/0 80/0/0 |
| Banca | | 79/0/0 79/10/0 |
| Billiton | | 76/0/0 76 12/6 |

### OILS.

| | | |
|---|---|---|
| Linseed | ton | 20/7/6 20/12/6 |
| Cocoanut, Cochin | | 35 0/0 0/0/0 |
| Do. Ceylon | | 27/5/0 0/0/0 |
| Palm, Lagos | | 20/10/0 0/0/0 |
| Rapeseed, English pale | | 23/5/0 23/10/0 |
| Do. brown | | 21/10/0 0/0/0 |
| Cottonseed ref. | | 21/10/0 23/0/0 |
| Oleine | | 22/0/0 24/0/0 |
| Lubricating, U.S. | | 4/0/0 5/0/0 |
| Do. refined | | 5/0/0 22/0/0 |
| TAR—Stockholm | barrel | 0/18/6 0/19/0 |
| Archangel | | 0/12/6 0/0/0 |

## TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us not later than 10 *a.m. on Thursdays.*]

BRADFORD (Yorks).—Accepted for the extension of a combing shed, Tong. Mr. T. Barker, architect, 5, Bond-street, Bradford. Quantities by the architect:—

| | |
|---|---|
| *Mason.*—G. Dixon, Birkenshaw | £2,370 0 0 |
| *Joiner.*—Toothill & Balmforth, Bradford | 986 10 0 |
| *Ironfounders.*—Whitehead Bros., Farsley | 460 0 0 |
| *Slater.*—F. Thompson, Stanningley | 295 0 0 |
| *Plumbers.*—J. Booth & Son, Dudley-hill, Bradford | 223 19 6 |
| *Plasterer.*—T. Bolton, Bradford | 125 0 0 |
| *Painter.*—T. Marsland, Bradford | 90 0 0 |
| *Gates and Railings.*—J. Bagshaw & Son, Batley | 54 0 0 |
| *Steam Engine.*—Marsden & Co., Heckmondwike | 1,330 0 0 |

BRISTOL.—For underdraining a portion of Canford Farm, Westbury-on-Trym, together with outfall, &c., for the Barton Regis Union Sanitary Authority. Mr. A. P. J. Cotterell, C.E., Lonsdale Chambers, Baldwin-street, Bristol:—

| | | | |
|---|---|---|---|
| W. H. Smith | £950 0 0 | W. F. Green | £738 0 0 |
| G. Heard | 769 16 4 | F. K. Martin, St. George's, Bristol* | 637 0 0 |
| J. Perkins | 761 0 0 | | |

* Accepted.

[Engineer's estimate, £798.]

CASTLEFORD (Yorks).—Accepted for the erection of school buildings, cookery, and laundry centres, Welbeck-street, for the School Board. Mr. Arthur Hartley, architect, Carlton-chambers, Castleford. Quantities by Mr. W. Hoffman Wood, Park-square, Leeds:—

| | |
|---|---|
| *Excavators, Bricklayers, and Masons.*—Watson & Elsworth, South Milford, Yorks | £2,850 0 0 |
| *Carpenters and Joiners.*—David Terry & Sons Hightown, Castleford | 1,340 10 0 |
| *Plasterer.*—George Binns, North-street, Castleford | 120 0 0 |
| *Slater.*—Samuel Evison, Pontefract-road, Castleford | 121 0 0 |
| *Plumber and Glazier.*—Richard Nicholson, Aire-street, Castleford | 490 0 0 |
| *Painter.*—J. Foster, Hightown, Castleford | 171 5 0 |

CROMER (Norfolk).—For sea wall and esplanade for the Cromer Protection Commissioners. Mr. H. Melliss, engineer, 232, Gresham House, E.C.:—

| | | | |
|---|---|---|---|
| Jarvis & Melton | £2,400 | Double | £1,900 |
| Bray | 2,222 | Young & Son | 1,864 |
| John Neave | 2,179 | Bell | 1,662 |
| Cafin | 2,015 | Cooke & Co., Battersea* | 1,568 |
| Pauling & Elliot | 2,000 | Bardell | 1,520 |

* Accepted.

DEWSBURY.—For the erection of an electric lighting station, also high chimney, for the Corporation. Mr. Henry C. Marks, C.E., Borough Engineer, Dewsbury:—

| | | | |
|---|---|---|---|
| J. E. Johnson | £4,160 14 0 | Ed. Chadwick & Sons | £3,562 0 0 |
| William Scott & Son | 3,940 10 0 | Ben Graham & Sons | 3,423 4 0½ |
| Holme & King | 3,833 9 3 | Mark Scott, Earlsheaton, near Dewsbury* | 3,418 4 4 |
| W. J. Milner | 3,766 5 0 | | |
| Crabtree & Denton | 3,695 18 0 | | |
| Chas. Whitehead & Sons | 3,614 11 2½ | | |

* Accepted.

DORCHESTER.—Accepted for the erection and completion of four cottages, Bell-street, Dorchester. Mr. A. L. T. Tilley, architect, 16, Cornhill, Dorchester:—

Tidby & Williams, Dorchester ..... £559 15 0

GRAYS (Essex).—For the supply of 500 or 1,000 tons of granite or quartzite, for the Grays Thurrock Local Board. Mr. A. C. James, Surveyor, Local Board Offices, Grays Thurrock:—

| | | Per ton. |
|---|---|---|
| Mundy & Co. | Belgian | 9 8 |
| " | West of England | 10 9 |
| Grimley & Son | Mountsorrel | 13 11 |
| Old Radnor Trading Company | | 16 6 |
| A. & F. Manuelle | Guernsey | 12 6 |
| J. Mowlem & Co. | " | 12 4 |
| R. L. & I. Fennings | " | 12 6 |
| William Griffiths | " | 12 0 |
| Nowell & Robson | " | 12 8 |
| J. Runnalls | Cornish | 9 6 |
| Blickfelat & Co. | " | 10 6 |
| L. Somerfeld | Belgian | 9 7 |
| C. M. Manuelle | " | 9 0 |
| E. J. Van Praagh & Co. | Leicestershire | 13 3 |
| Enderly and Stoney Stanton Granite Company | " | 13 2 |
| H. R. Tryr | Hartshill | 13 4 |
| W. Chandle & Co. | Irish | 12 3 |
| Kent Road Maintenance Co. | Quartzite | 10 0 |
| E. J. & W. Goldsmith, Grays | New Zealand | 10 2† |
| " " | Hudson Bay* | 9 2† |

* Accepted. † Including wharfage.

JARROW.—Accepted for the execution of several works at St. Paul's churchyard, gateway, drainage, &c., for the Hedworth, Monkton, and Jarrow Burial Board. Mr. J. H. Morton, architect, King-street, South Shields. Quantities by the architect:—

J. Yeeles, Jarrow-on-Tyne ..... £125 0 0

KENDAL.—For excavating and laying 2,230 yards of 3-in. cast-iron water-pipes, cisterns, &c., Barbon, for the Union Rural Sanitary Authority. Mr. John Cannon, Surveyor, Lowther-street, Kendal:—

| | | | |
|---|---|---|---|
| Jacob Tanner | £280 11 5½ | S. Carradus & Son | £278 15 0 |
| T. & W. Dirkin | 278 15 0 | William Parsons | 276 8 6½ |
| Joseph Dawson | 278 15 0 | | |

LANGFORD HALL (Essex).—For the erection of farm buildings, for Mr. A. Lomas. Mr. P. M. Beaumont, A.M.Inst.C.E.:—

| | | | |
|---|---|---|---|
| J. Gozzett | £1,075 | J. Smith, Witham* | £975 |
| S. Richards | 1,040 | E. West | 970 |

* Accepted.

LONDON.—For alterations and repairs at 64, City-road, for Messrs. Elder & Son. Mr. John Farrer, architect, Albion Chambers, 20, Finsbury Pavement, E.C.:—

| | | | |
|---|---|---|---|
| F. & F. J. Wood | £239 | Eddie | £178 |
| G. S. Archer | 185 | Allen & Son | 145 |

LONDON.—For the supply and delivery of 10,000 sup. ft. of best 3-in. tooled hard York paving, for the Local Board. Mr. H. O. Thomas, Surveyor, Town Hall, Woolwich:—

| | Per 100 sup. ft. |
|---|---|
| Nowell & Robson | £3 18 0 |
| Walker | 3 15 0 |
| Mowlem | 3 15 0 |
| Somerfeld | 3 14 9 |
| Turner | 3 13 6 |
| Beavers | 3 12 0 |
| Manuelle | 3 11 11 |
| Fry Bros. | 3 11 9 |
| Trickett | 3 11 7 |
| Cooper & Co., 47-48, King William-street* | 3 11 3½ |
| Griffiths | Informal. |

* Accepted.

LONDON.—For kerbing, paving, channelling, &c., Hawestead-road, Catford, for the Lewisham Board of Works:—

Lagdon & Crawford, Canning Town ..... £661 0 0

LONDON.—For making-up and paving Ranelagh-gardens (Section I.), and Town Mead-road (Section II.), for the Fulham Vestry. Mr. W. Sykes, New Streets Surveyor, Town Hall, Walham-green, London, S.W.:—

| | TOWN MEAD-ROAD, SEC. II. | | | | | | RANELAGH-GDNS., SEC. II. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Roadway. | York. | Adamant. | Victoria. | Stuarts. | Imperial. | Roadway. | York. | Adamant. | Stuarts. | Imperial. | |
| | £ | £ | £ | £ s. | £ | £ | £ | £ | £ | £ | £ | |
| Nowell & Robson | 815 | 399 | — | — | — | — | 217 | 105 | — | — | — | |
| E. Parry | 690 | — | — | — | — | — | 215 | — | — | — | — | |
| A. Kellet | 770 | 387 | — | — | — | — | 151 | 101 | — | — | — | |
| E. Rogers & Co. | 648 | 420 | — | — | — | — | 197 | 120 | — | — | — | |
| J. Mears | 595 | — | — | — | — | — | 181 | — | — | — | — | |
| Fry Bros. | 725 | 390 | 273 | — | — | — | 210 | 106 | 75 | — | — | |
| H. J. Greenham | 650 | — | — | — | — | — | 200 | — | — | — | — | |
| G. Wimpey & Co. | 572 | 392 | 284 | — | — | — | 190 | 112 | 81 | — | — | |
| S. Hudson | 782 | — | — | 336 10 | — | — | — | — | — | — | — | |
| T. Adams | 628 | 422 | — | — | 312 | 335 | 191 | 112 | — | 84 | 88 | |
| J. Hampson & Co. | — | 396 | — | — | — | — | — | — | — | — | — | |
| Imperial Stone Co. | — | — | — | — | — | 306 | — | — | — | — | 81 | |

LONDON.—For paving and roadmaking, Alleyn-road, Dulwich, for the Camberwell Vestry. Mr. O. S. Brown, Surveyor, Works Department, Vestry Hall, Peckham-road, London, S.E. Quantities by the Surveyor:—

*Masons' and Road Work.*

| | | | |
|---|---|---|---|
| A. T. Caley | £1,600 0 0 | Mayo & Co. | £1,381 11 8 |
| Mowlem & Co. | 1,553 15 0 | S. Hudson, Streatham (accepted) | 1,365 1 8 |
| W. H. Wheeler | 1,528 19 2 | J. G. B. Marshall | 1,129 1 8 |
| T. Adams | 1,404 3 4 | | |

*Asphalte Work.*

| | | | |
|---|---|---|---|
| J. G. B. Marshall | £1,286 13 4 | Limmer Co. | £930 13 4 |
| French Asphalte Co. | 1,004 18 4 | Asphaltic Limestone Co. (accepted) | 898 10 0 |
| Val de Travers | 988 16 8 | | |

LONDON.—For the execution of paving works and the supply of paving materials on a schedule of prices, for the Whitechapel District Board of Works. Mr. W. La Riviere, Surveyor to the Board:—

| | Paving. Above | Materials. Above |
|---|---|---|
| George James Anderson | 7½ per cent. | 12 per cent. |
| John Mowlem & Co. | 6 " | 12½ " |
| William Griffiths | 3½ " | 8½ " |
| William Farrar | — " | 9½ " |
| William Gibbs | 9 " | 10½ " |
| John Byford | — " | 15 " |
| Nowell & Robson | 7 " | 12 " |
| George G. Rutty | 10 " | — |

LONDON.—For the erection of premises, Hetherington-road, Brixton, S.W., for Mr. J. Pratt. Mr. M. V. Treleaven, architect and surveyor, Acre-lane, Brixton:—

| | | | |
|---|---|---|---|
| Rice & Son | £750 | Price | £675 |
| Young & Son | 735 | Stubbs | 634 |

LONDON.—For alterations and additional stalls to stables, Forest Lodge, Tulse Hill, S.W., for Mr. Geo. Adney Payne. Mr. Alfred Parnacott, surveyor, 93, York-road, Westminster Bridge-road, S.E.:—

| | | | |
|---|---|---|---|
| Maxwell & Co. | £559 0 | Peacock Bros. | £468 10 |
| Trollope & Sons | 476 0 | | |

LONDON.—For the supply of about 24,000 ft. of special tooled York paving, for the Vestry of Bermondsey:—

| | Per 100 sup. ft. |
|---|---|
| A. & F. Manuelle, 101, Leadenhall-street, E.C. | £3 5 10 |

LONDON.—For kerbing, channelling, metalling, &c., Chestnut-road, Catford, for the Lewisham Board of Works:—

Fry Bros., Greenwich ..... £319 0 0

LONDON.—For pulling down and rebuilding, Nos. 62, 64, & 66, Gresham-street, City, for Mr. Frederick Seaton. Messrs. Gardiner, Son, & Theobald, architects:—

| | | | |
|---|---|---|---|
| Patman & Fotheringham | £11,507 | Gould & Brand | £10,857 |
| Holloway Bros. | 11,315 | Grover & Sons | 10,847 |
| C. Ansell | 11,100 | Allen & Sons | 10,665 |
| Ashby & Horner | 10,987 | Killby & Gayford* | 10,534 |
| William Downs | 10,934 | | |

* Accepted.

LONDON.—For electric lighting and gasfitting at the "Green Man," Bucklersbury, City:—

| | | | |
|---|---|---|---|
| Christian | £104 0 | Winn* | £66 15 |
| Pragnell | 73 10 | | |

* Accepted.

LONDON.—For the erection of new drill-hall at Tredegar-road, Bow, for the 2nd T.H.R. Volunteers. Mr. G. E. Holman, architect:—

| | | | |
|---|---|---|---|
| Jarvis & Sons | £4,863 | T. H. Craig* | £3,938 |
| Perry & Co. | 4,360 | | |

* Accepted.

PALMER'S GREEN (Middlesex).—For finishing five houses at Bowes Park, Palmer's Green, for Mr. William Cox. Mr. J. W. Stevens, architect, 21, New Bridge-street, E.C.:—

G. S. Archer, City-road ..... £785 0 0

Accepted exclusive of necessary alterations.

PENRITH.—For the execution of water supply works, Glassonby, for the Penrith Union Rural Sanitary Authority. Mr. George Watson, C.E., Penrith:—

*Cast-Iron Pipes.*

| | | | |
|---|---|---|---|
| Cochrane & Co. | £145 14 4 | Cochrane, Grove, & Co. | £128 17 0 |
| Clay Cross Co. | 139 18 6 | Shaw & McInnes | £119 4 0 |
| E. & W. H. Haley | 136 4 0 | James Ritchie | 117 15 0 |
| Watson, Gow, & Co. | 135 8 3 | Dodds Bros. & Co. | 117 14 10 |
| R. Laidlaw & Son | 131 16 2 | | |
| Cameron & Roberton | 129 10 6 | | |

*Valves and Hydrants.*

| | | | |
|---|---|---|---|
| R. Laidlaw & Son | £46 6 2 | J. Blakeborough & Sons | £32 16 6 |
| Glenfield Iron Co. | 41 11 0 | Hamilton, Woods, & Co. | 29 16 |
| J. Stone & Co. | 36 6 11 | | |
| Dodds Bros. & Co. | 35 13 1 | | |

*Excavating, Carting, Laying and Jointing Mains.*

| | | | |
|---|---|---|---|
| J. McKnight & Son | £177 19 0 | George Dixon | £89 5 10 |
| Joseph Dixon | 90 10 0 | | |

*Service Reservoir, Ram House, Trough at Spring and Feed Well.*

| | | | |
|---|---|---|---|
| J. Mc Knight & Son | £165 3 0 | George Dixon | £102 2 2 |

*For the Whole Four Contracts.*

Joseph Jackson, Penrith (accepted) ..... £339 19 7

*Ram, Injection Pipe, and Delivery Pipe.*

J. Blake, Accrington (accepted) ..... £172 0 0

PENRITH.—For the execution of water-supply works, Kirkoswald, for the Penrith Union Rural Sanitary Authority. Mr. George Watson, C.E., Penrith:—

*Cast-iron Pipes.*

| | | | |
|---|---|---|---|
| Cochrane & Co. | £106 14 10 | Cochrane, Grove, & Co. | £94 7 6 |
| Clay Cross Co. | 102 10 0 | Shaw & McInnes | 89 10 0 |
| E. & W. H. Haley | 99 14 0 | Dodds Bros. & Co. | 87 10 0 |
| R. Laidlaw & Son | 96 0 0 | J. Ritchie | 87 7 9 |
| Cameron & Roberton | 95 18 0 | | |

*Valves and Hydrants.*

| | | | |
|---|---|---|---|
| R. Laidlow & Sons | £56 0 6 | J. Blakeborough & Sons | £30 16 6 |
| Glenfield Co. | 48 10 0 | Hamilton, Woods & Co. | 37 9 6 |
| J. Stone & Co. | 46 14 6 | | |
| Dodds Bros. & Co. | 45 11 6 | | |

*Excavating, Carting, Laying and Jointing Mains.*

| | | | |
|---|---|---|---|
| J. McKnight & Son | £115 8 0 | Joseph Dixon | £65 15 8 |
| George Dixon | 71 7 0 | | |

*Service Reservoir, &c.*

| | | | |
|---|---|---|---|
| J. McKnight & Son | £121 6 4 | George Dixon | £107 11 6 |

*For the Whole.*

Joseph Jackson, Penrith (accepted) ..... £286 11 1

PORTSMOUTH.—For kerbing, channelling, road-making, &c., New-road, Buckland, for the Portsea Burial Board. Messrs. Rake & Cogswell, architects, Prudential Buildings, Landport, Portsmouth:—

| | | | |
|---|---|---|---|
| Wheeler | £1,253 | J. H. Corke | £847 |
| Messrs. Light & Son | 937 | H. Jones, Portsmouth* | 785 |

* Accepted.

SANDGATE.—For reinstating and rebuilding in part to Tannachie House, The Homestead, Sandgate, Kent, for Mr. J. Pearson. Mr. M. V. Treleaven, architect and surveyor, Acre-lane, Brixton:—

| | | | |
|---|---|---|---|
| Petts & Son | £1,100 | Hayward & Paramor | £898 |
| Denne & Son | 925 | | |

SOUTHALL (Middlesex).—For the supply of road materials, for the Southall-Norwood Local Board. Mr. T. Newell, Surveyor:—

| | Sifted gravel, at per cube yd. | Broken flints, at per cube yd. | Hoggin, at per cube yd |
|---|---|---|---|
| | s. d. s. d. | s. d. | s. d. s. d. |
| Francis Newell, Jun. | 3 8 to 3 11 | 6 0 | 3 11 to 4 2 |
| Henry Lee | 3 9 to 4 0 | 6 6 | 4 0 to 4 3 |

SOUTH SHIELDS.—Accepted for the erection of infirmary pavilion, lunacy wards, laundry buildings, &c., at the workhouse, for the Union Guardians. Mr. J. H. Morton, architect, King-street, South Shields. Quantities by the architect:—

Cowper & Henderson, Jarrow-on-Tyne ..... £9,137 6 2

SOUTH SHIELDS.—Accepted for laying about 139 yards earthenware pipe-sewer at Whitburn Colliery Village; and other work, for the Union Rural Sanitary Authority of the South Shields Union. Mr. J. H. Morton, architect, King-street, South Shields. Quantities by the architect:—

Wm. Allison, Whitburn ..... £214 0 0

SOUTH SHIELDS.—Accepted for the construction of a reservoir at the workhouse, Harton, for the Union of Guardians. Mr. J. H. Morton, architect, King-street, South Shields. Quantities by the architect:—

Wm. Allison, Whitburn ..... £462 0 0

*Suction Pipe and Steam Pump.*

Bainbridge & Crimson, South Shields ..... £110 0 0

SOUTH SHIELDS.—Accepted for the erection of shed in labour yard, at the workhouse, for the Union Guardians. Mr. J. H. Morton, architect, South Shields. Quantities by the architect:—

John Moore, South Shields ..... £300 0 0

STOCKTON-ON-TEES.—For the erection of school buildings, Nelson-terrace, for the School Board. Mr. J. Mitchell Bottomley, architect, 28, Albert-road, Middlesborough:—

| | | | |
|---|---|---|---|
| J. Davison | £15,222 11 11 | Ives & Co. | £13,500 9 9 |
| J. G. Robson | 14,595 0 0 | Johnson & Hanby | 13,578 0 0 |
| Craggs & Benson | 14,334 0 0 | W. C. Atkinson, Stockton-on-Tees* | 13,334 4 7 |
| Bastiman Bros. | 14,056 2 3 | | |
| A. J. Cooke | 13,799 0 0 | | |

* Accepted subject to approval of Educational Department.

WALTHAMSTOW.—Accepted for providing and laying 3,600 ft. Norwegian granite kerb, for the Local Board. Mr. G. W. Holmes, C.E., Surveyor, Town Hall, Walthamstow:—

| | Per yard straight. | Per yard circular. |
|---|---|---|
| Thomas Adams, Green Lanes, N. | £0 5 2 | £0 6 0 |

WELLINGBOROUGH. — For the erection of stable with ambulance room over, Church-street-yard, for the Local Board. Mr. Edwd. Sharman, Surveyor, Local Board Offices, Wellingborough. Quantities by Mr. C. Archer:—

| | | | |
|---|---|---|---|
| Robert Marriott | £213 0 | Wm. Stevens | £170 10 |
| W. M. Goodman | 201 10 | H. Dorman and W. E. Giles, Wellingborough* | 169 15 |
| G. A. Smith | 184 0 | | |
| Hacksley Bros. | 172 15 | | |

* Accepted.

*New Institute, Bishopsgate Without.*—In the list of tenders for this work, which appeared in our last issue, page 401, the name "Williamson Bros." should have been Wilkinson Bros.

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T. B. (as we have intimated to other correspondents, the mere fact that an inquiry was held is of little interest unless we have the results).

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

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218 and 220, HIGH-STREET, BOROUGH, S.E.
LIVERPOOL:
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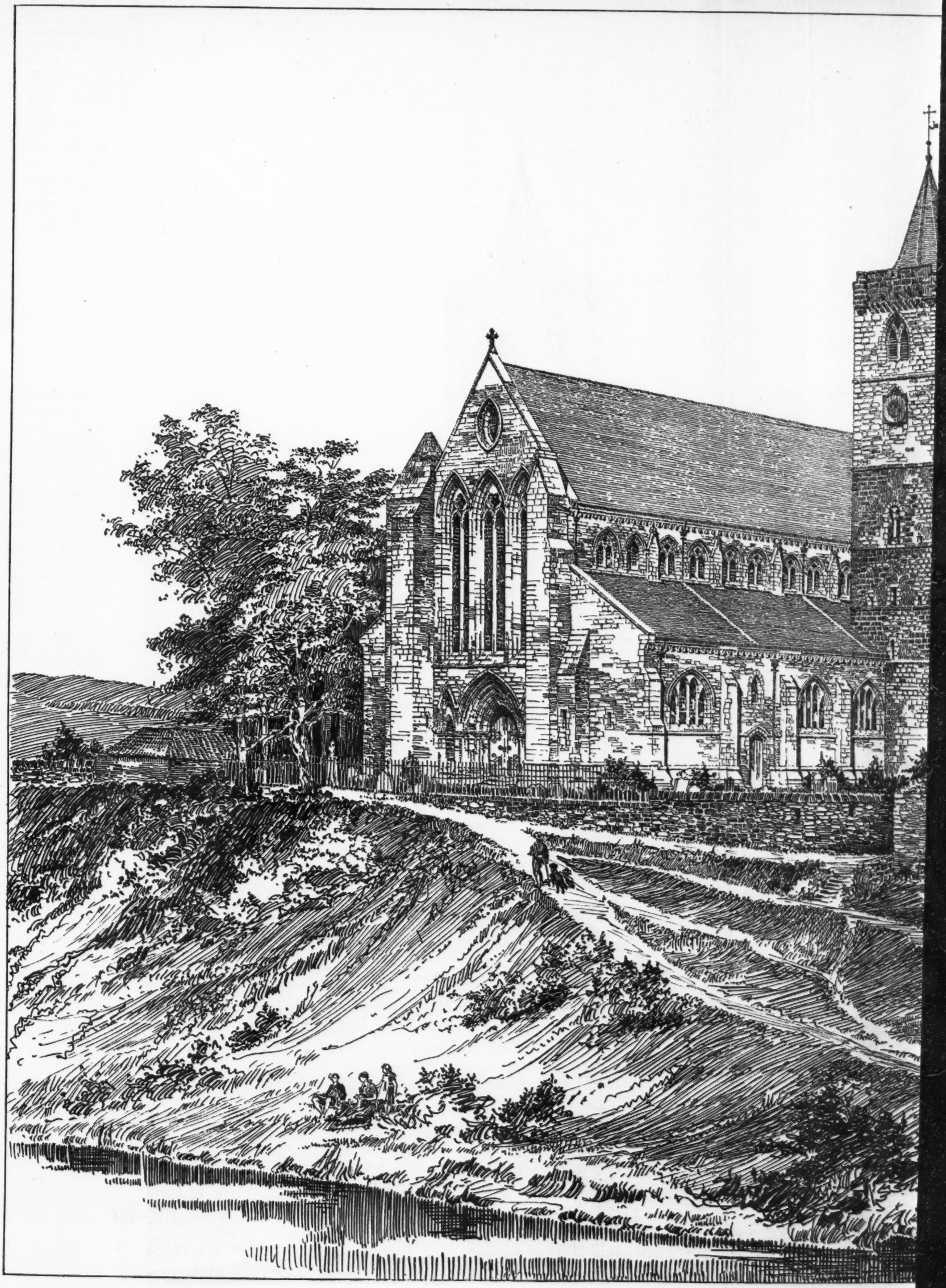
47 and 49, ST. ENOCH-SQUARE.



THE ANCIENT CATHEDRALS OF SCOTLAND.—Drawn

No. 6. DUNBLANE: FROM THE SOUTH-

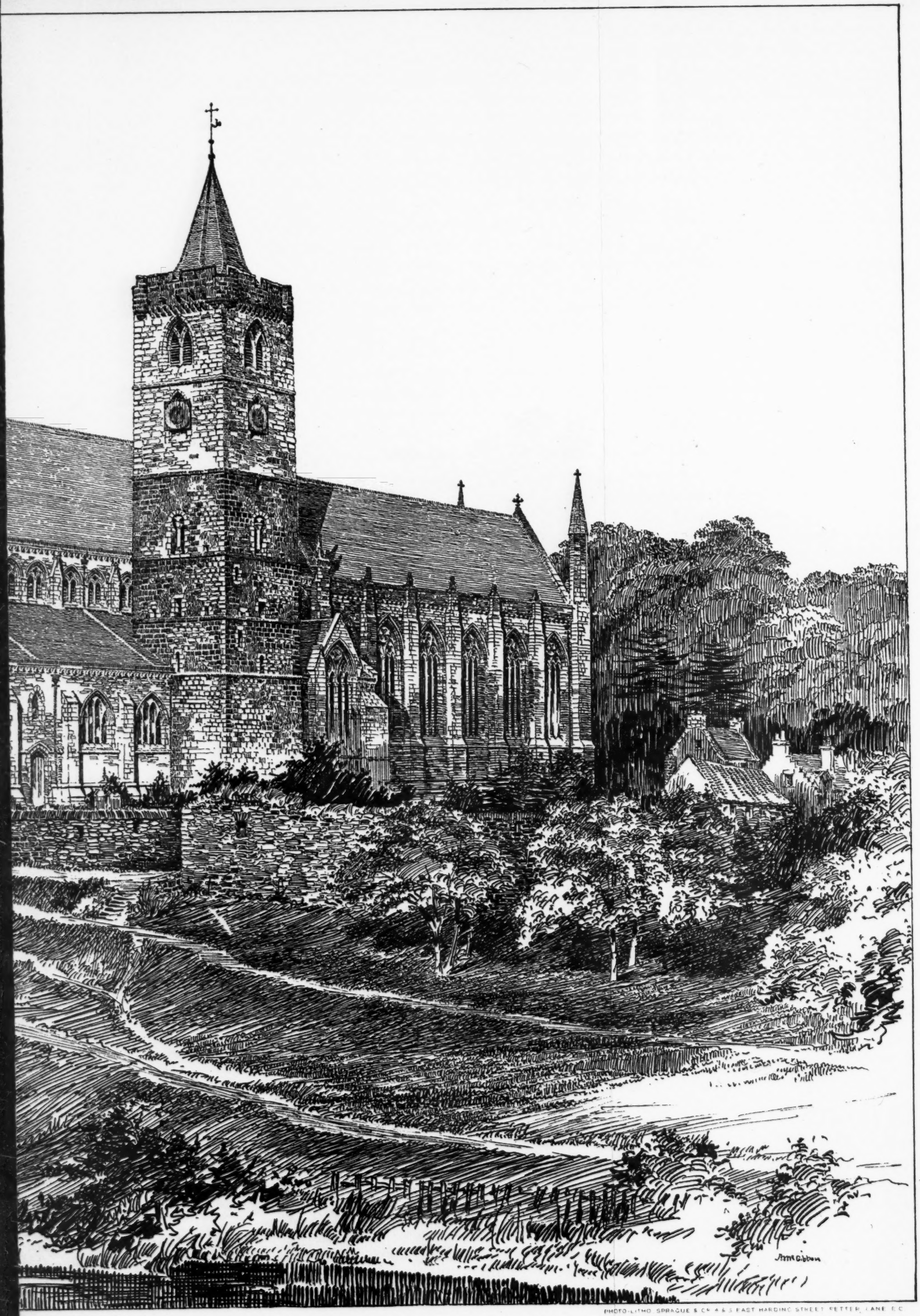
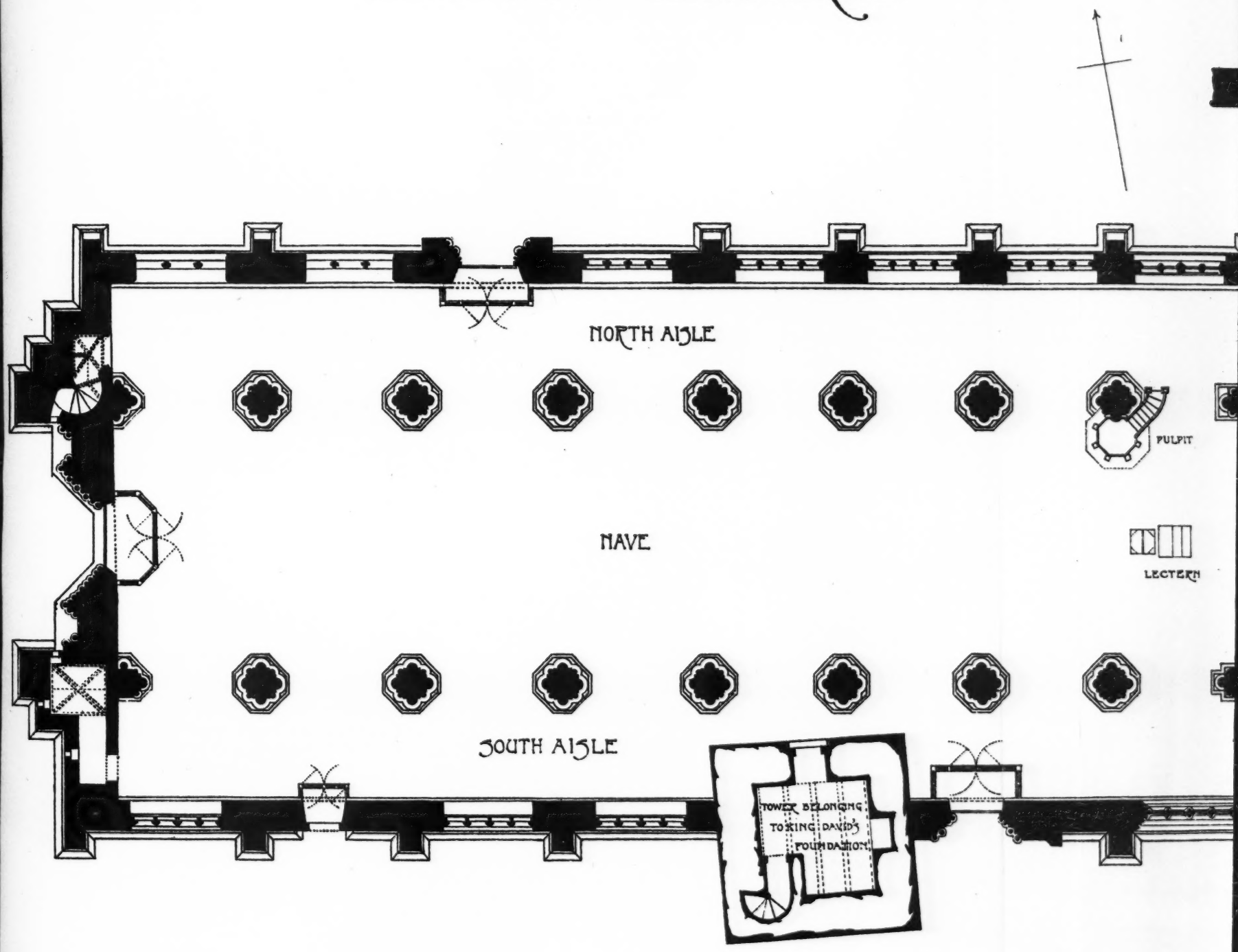


PHOTO-LITHO SPRAGUE & Co 4 & 5 EAST HARDING STREET FETTER LANE E.C.

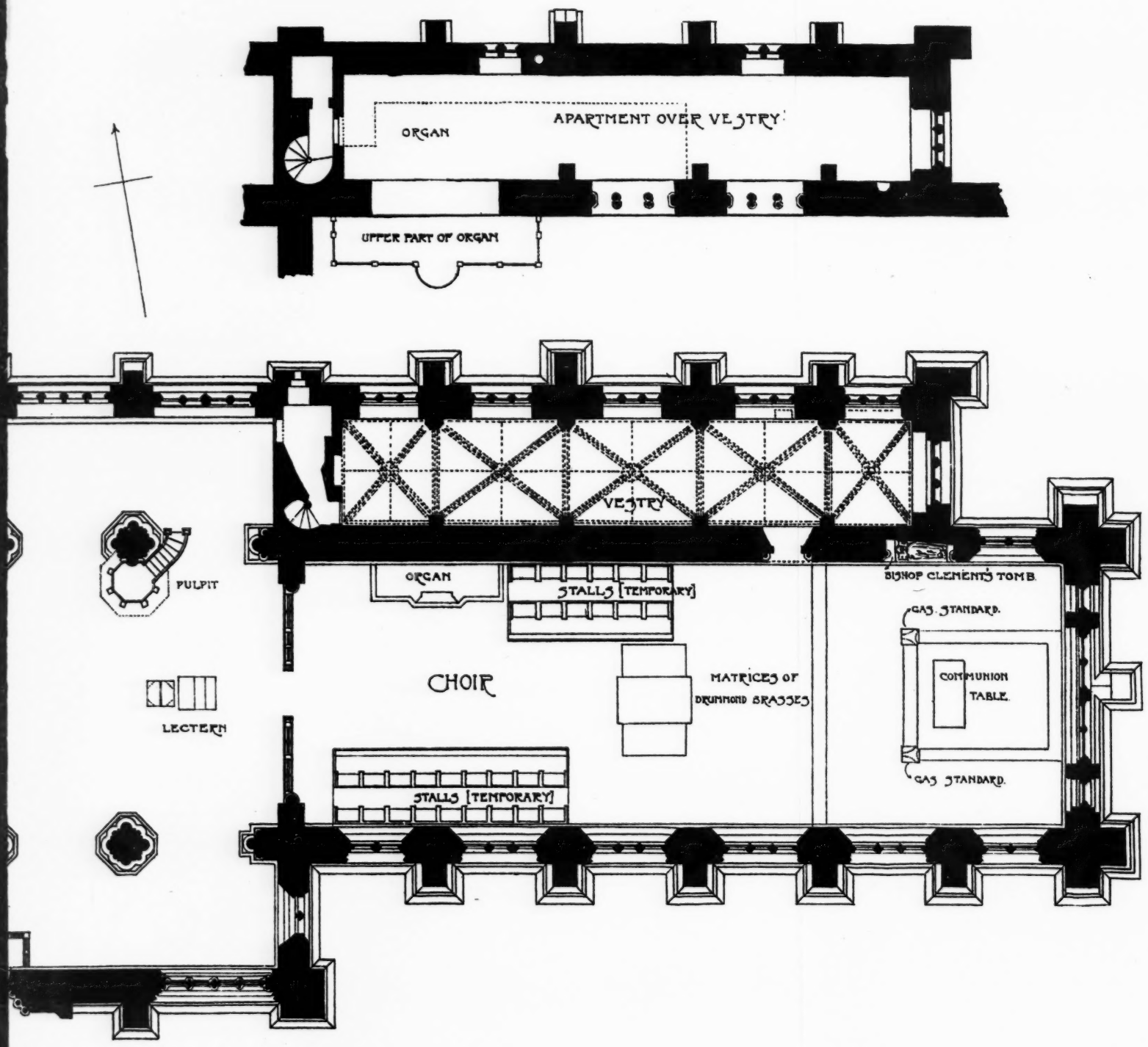
OF SCOTLAND.—Drawn by Mr. Alexander McGibbon.

BLANE: FROM THE SOUTH-WEST.

# DUNBLANE CATHEDRAL




*Tower - 11th or early part of 12th Century.*
*The Main Building - circa 1250.*




R. Rowand Anderson LL.D.
Architect
Edinburgh

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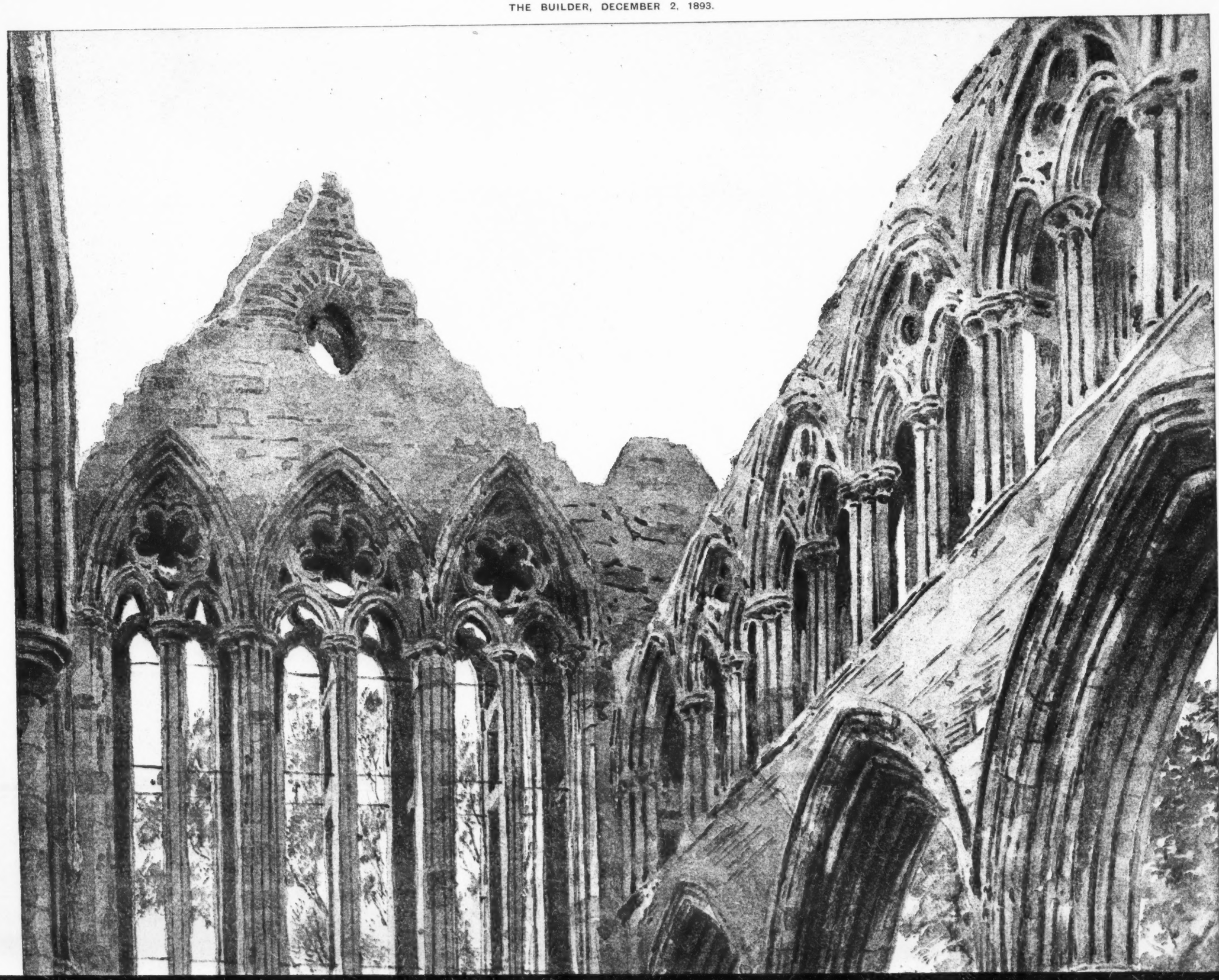


DUNBLANE CATHEDRAL BEFORE RESTORATION: VIEW IN THE NAVE, LOOKING WEST.

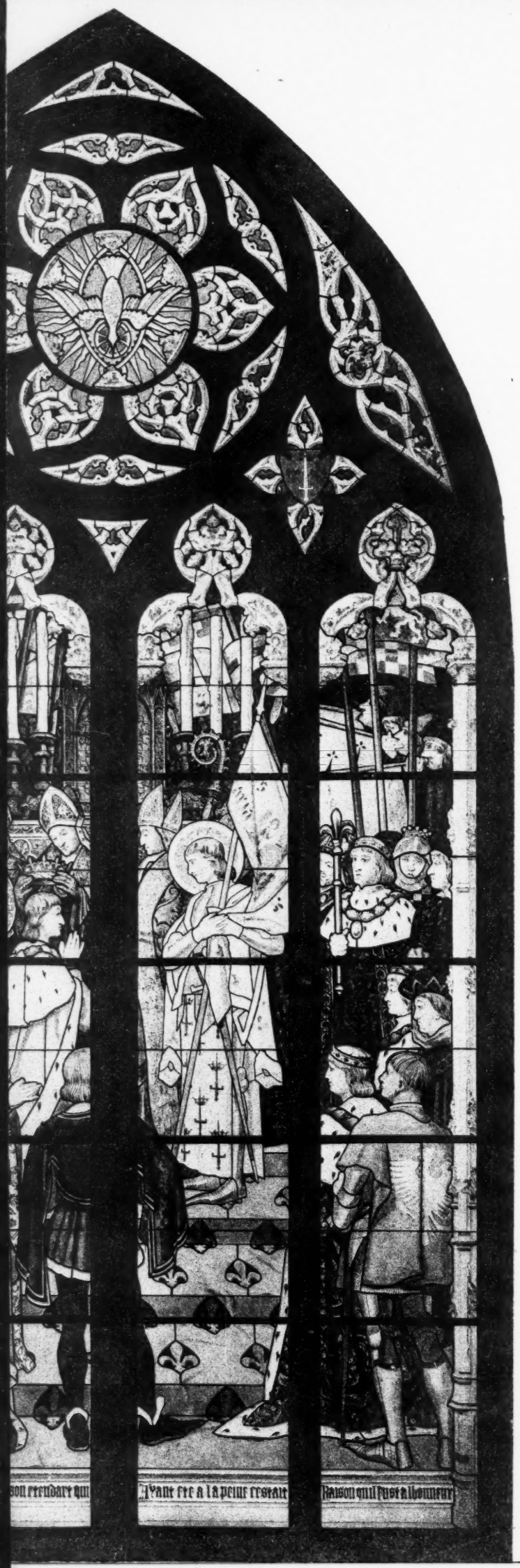
From a Water-Colour Drawing by Mr. R. Phené Spiers, F.R.I.B.A.

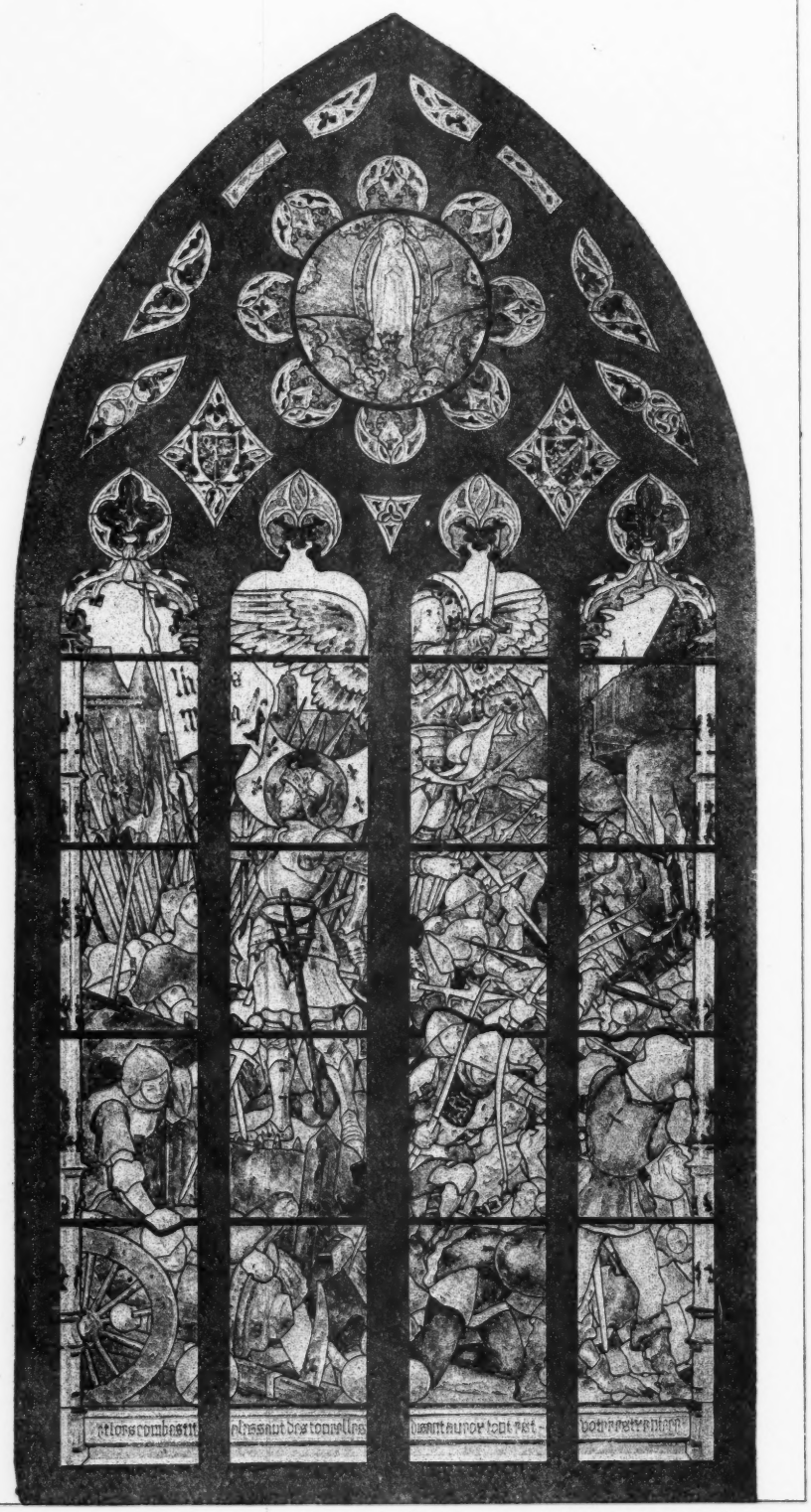
JOAN OF ARC TAKEN PRISONER AT COMPIÈGNE.

JOAN OF ARC AT THE CORONATION AT RH

DESIGNS SELECTED IN COMPETITION FOR THE NEW WINDOWS FOR THE CATHEDRAL OF

DESIGNED BY M. JACQUES GALLAND, IN COLLABORATION





INÉ PHOTO SPRAGUE & Cº 4 & 5 EAST HARDING STREET FETTER LANE E.C.

ARC AT THE CORONATION AT RHEIMS.

JOAN OF ARC AT THE ASSAULT ON TOURELLES.

S FOR THE CATHEDRAL OF ORLÉANS, ILLUSTRATING THE HISTORY OF JOAN OF ARC.

UES GALLAND, IN COLLABORATION WITH M. GIBELIN.